

STANDARD
AUTO-ELECTRICIAN'S
MANUAL

STANDARD ENGINEERING & PUBLISHING CO.
BOSTON, MASS.

IGNITION TIMING

GENERAL INSTRUCTIONS FOR SERVICE STATIONS NOT EQUIPPED WITH *MOTOR GAUGE* OR OTHER PRECISION APPARATUS FOR VALVE AND IGNITION TIMING.

The method of timing all engines progresses more or less along the same lines. Once the fundamental principles are thoroughly understood the operation becomes quite simple.

A.—CYLINDERS ARE NUMBERED 1, 2, 3, 4, etc., commencing with No. 1 at radiator end. In the case of "Vee" type engines, No. 1 usually commences at the radiator end, right hand block (as viewed from driver's seat), and progresses to the rear, starting again at the radiator end of left hand block as 5, 6, 7, 8; however, commencing with the year 1932 some car manufacturers use odd numbers for all cylinders in one bank, and even numbers for cylinders in the other bank, numbering from the radiator back. It is well to remember that, as yet, no standard as to which bank shall be "odd" or "even" has been established, and as strange as it may seem, the same manufacturer will label the right bank with "odd" numbers on "Vee" 8 productions, while their "Vee" 12 and "Vee" 16 cars will have the right bank labelled with "even" numbers (see 1932 Cadillac and Lincoln diagrams). In cases of this sort the key to the labeling will be found by the numbers stamped on the cylinder block, either just above or below the spark plug holes. Sometimes cylinders are designated 1R, 2R and 1L, 2L, etc. All right and left positions are determined as viewed from the driver's seat, unless otherwise specified.

B.—FIRING ORDER may easily be determined by watching the order of intake or exhaust valve movements, or by checking the order in which the high tension spark jumps at the plugs, providing the distributor wiring has not been changed since the engine last ran. Inasmuch as 1-2-4-3 or 1-3-4-2 for four cylinder engines, 1-5-3-6-2-4 or 1-4-2-6-3-5 for six cylinder engines, and 1-6-2-5-8-3-7-4 or 1-4-7-3-8-5-2-6 for straight eight engines, are the firing orders generally used, it is only necessary to check until it is ascertained which cylinder fires after No. 1. If, for instance, in the case of a straight eight engine, it is found that No. 6 cylinder fires after No. 1, it is evident, without further testing, that the firing order is 1-6-2-5-8-3-7-4.

C.—CAUTION IN SELECTING TOP DEAD CENTER: Bear in mind that when selecting T.D.C. (Top Dead Center), if the spark is timed to occur exactly at this point, with the spark lever fully retarded, any small inaccuracy in setting might cause the spark to occur before T.D.C., and cause serious damage to the Bendix drive or starting motor. For this reason many manufacturers issue instructions that advise setting the spark to occur with piston on T.D.C., and spark one-third advanced, or T.D.C. mark on flywheel one or two inches past the indicator, with spark retarded. In most cases, however, there is sufficient play between the timing gears, so that when the driving gear on the crankshaft starts to revolve, a small time interval will occur before the distributor shaft starts to turn; thereby allowing the piston to gain a very slight downward motion before the spark occurs.

No. 1—LOCATE TOP DEAD CENTER

VALVE METHOD: In four, six, or straight eight engines, pistons No. 1-4, 1-6, and 1-8 are mechanically in the same position with respect to each other. However, they are one-half cycle apart with reference to their functions. In other words, when No. 1 piston is on its firing stroke, No. 4 has just completed its exhaust stroke, and is commencing its intake operation. By watching No. 4 exhaust valve on a four cylinder engine, No. 6 on a six cylinder, or No. 8 on a straight eight (which valve closes between 7 and 10 degrees past T.D.C.), the exact position of No. 1 piston can be ascertained with the further assurance that it is on its firing stroke, because the closing of No. 4, 6 or 8 exhaust valve indicates that piston No. 4, 6 or 8 is finishing its exhaust stroke and commencing its intake stroke; therefore, No. 1 piston must be in exactly the same position on its firing stroke. To check the movement of the exhaust valve place a piece of paper between the stem and lifter, pull lightly on paper as engine is slowly turned, until paper is released. At this point the valve has seated. Note that this setting is slightly past T.D.C.

FLYWHEEL METHOD: Most engines have their flywheels marked to indicate the position of the pistons in the cylinders. The usual marking for top dead center is a straight line, accompanied by lettering such as "U.D.C. 1-6", "T.D.C. 1-4", "D.C. 1-6", etc. Sometimes a special marking, "IGNITION", is used and in the case of the Pierce-Arrow, it is two inches (as measured on flywheel) after "D.C." When no top dead center marks are shown, the valve timing marks can be used. These take the form of "1-6 Ex. C.", etc. The valve markings indicate that piston is from 7 to 10 degrees (as measured on flywheel) past TOP DEAD CENTER.

An opening in the top of the flywheel housing (usually covered) is directly on the center line of the engine, and generally has an indicator, file mark, or line to accurately represent the center line. If none appears, the center line can easily be found by measuring the width of opening, and placing a small file mark on the edge; this mark to be midway between the two sides. By removing the cover the line on flywheel can be carefully located opposite the indicator, at which point, of course, No. 1 piston is on T.D.C. Other marks on the flywheel are used for valve timing. Some engines have this opening on the side of the flywheel housing, where it is accessible by simply raising the hood.

In using this method care must be exercised to select the T.D.C. mark when No. 1 piston is finishing its compression stroke. This can best be determined by observing when No. 4, 6, or 8 exhaust valve just closes, or by observing that both No. 1 intake and exhaust valves have remained closed during the stroke. Feeling for compression at the spark plug hole will also indicate this stroke.

IGNITION TIMING (continued)

WIRE METHOD: When the spark plug holes are located sufficiently close to the piston, a stiff wire (sometimes even a finger) can be inserted in the cylinder, which will rest on the top of the piston and, accordingly, register the movement of same. When it is certain that No. 1 piston is coming up on its compression stroke, watch the wire until there is no further rise, and until it just tends to go downward.

COMPRESSION METHOD: Remove No. 1 spark plug, and place thumb over hole. When the engine is turned over by hand a short distance at a time, it will create a slight compression, which can be released by removing the thumb. When no compression exists after a slight movement, it is an indication that T.D.C. has been reached.

No. 2—LOCATE THE ROTOR.

After T.D.C. has been accurately located, the next operation is to so set the distributor and breaker points, that a spark will occur in this position, and be distributed to the spark plug in No. 1 cylinder.

RETARD THE SPARK: Practically all modern ignition distributors are of the full-automatic advance type, which means that there is no problem of manually advancing or retarding the spark. On such cars as still use a manual spark control, it usually takes the form of a "spark retard", operated by a pull knob located on the instrument board. With the knob pulled all the way out the spark is fully retarded. In timing distributors of this type, always refer to the individual car wiring diagram and data for detailed instructions as to the position the advance mechanism should be in when performing this work.

ADJUSTING THE POINTS: Remove the distributor cap which exposes the rotor. Remove the rotor, which should lift off easily. If it sticks, carefully pry it off by using two screw drivers under opposite edges. Slowly turn engine until the fibre cam follower is at the high point on a cam lobe. Adjust the breaker points to the opening specified for that distributor. Use a thickness gauge to measure this opening, unless your shop is equipped with a Distributor Test Fixture, in which case this adjustment should be made as explained on the page, found in this section, entitled "Importance of Correctly Adjusted Breaker Point Gaps". Replace rotor. Hold the distributor cap over the igniter, so that it represents its normal position. Slowly turn engine until breaker points just start to open. In this position the rotor should be under the distributor terminal that leads to No. 1 cylinder. It is assumed that all of the high tension wires are in place. If they are not connected, any terminal can be selected as No. 1, so long as the rest of the terminals are connected to the cylinders in the succession indicated by the firing order. If the firing order is 1-5-3-6-2-4, the terminal following No. 1 should connect to No. 5 cylinder, the next terminal to No. 3 cylinder, and so on around the distributor head. After the position of the rotor is located the timing should be accurately set.

No. 3—SET THE SPARK.

Several methods are explained that represent the application of various cars. Bear in mind that the objective in all methods is exactly the same; that is, to have the points just open when the rotor is under No. 1 terminal.

(A). A very accurate method of setting the points is to turn on the ignition and watch the ammeter readings. As the cam opens the breaker points, the ammeter will drop to zero. This method is especially valuable where the breaker is so located as to make it difficult to watch the points.

(B). Another method is one in which the cam is not disturbed, but the entire breaker mechanism is revolved about the cam. Here, too, the rotor must be located under No. 1 terminal before final adjustment is made. Loosen clamping device which holds the distributor in place, and turn the ignition "on". Disconnect the spark plug wire from No. 1 plug, and place it so that the terminal is about 1/16 inch from any metallic part of the engine. By grasping the distributor cup, first turn the whole assembly a short distance IN THE DIRECTION of normal distributor shaft rotation. Next, slowly turn the assembly AGAINST the normal distributor shaft rotation, until a spark is seen to jump between No. 1 spark plug wire and ground. Stop at once, and tighten the distributor clamping device.

ADVANCE TIMING: Set the spark lever in the fully advanced position. Approach T.D.C., as heretofore, but stop when the flywheel mark has 1½ to 2 inches (or whatever instructions are given) to go, before being opposite the indicator on flywheel housing. In some instances a special advance timing mark is placed on the flywheel (Studebaker, "AD-SP"), and this mark should be placed OPPOSITE the indicator. With the flywheel in this position the breaker points should just be ready to open, providing the ignition is properly timed.

AUTOMATIC ADVANCE: Automatic advance is provided, usually for about 16-20 degrees out of a total of about 50-70 degrees, leaving an average of 19-50 degrees for manual control. The purpose of the automatic spark advance is to provide proper spark control for varying driving speeds. During the past few years automatic advance mechanisms have been so highly perfected that an auxiliary manual spark control is today almost unnecessary; however, on such cars as still do incorporate the manual control, it will be found that they are operated in the full advanced position, and are only made use of when starting the engine in extremely cold weather.

LAMP DATA

MAZDA
LAMP

TABLE REVISED TO JUNE 1, 1933

No.	USED FOR	VOLTS	C.P.	BASE	AMPS.	STYLE	B or C
61	Rear & Inst. (2 in series)	3-4	2	S.C.	0.84	G-6	B
62	Rear & Inst. (2 in series)	3-4	2	D.C.	0.84	G-6	B
63	REAR, INST., SIDE, STEP, AUX. HEAD...	6-8	3	S.C.	0.53	G-6	C
64	REAR, INST., SIDE, STEP, AUX. HEAD...	6-8	3	D.C.	0.53	G-6	C
67	REAR, INST., SIDE, STEP, AUX. HEAD...	12-16	3	S.C.	0.32	G-6	C
68	REAR, INST., SIDE, STEP, AUX. HEAD...	12-16	3	D.C.	0.32	G-6	C
81	DOVE & PANEL	6-8	6	S.C.	0.84	G-6	C
82	DOVE & PANEL	6-8	6	D.C.	0.84	G-6	C
87	Stop, Backing	6-8	15	S.C.	1.69	S-8	C
88	Stop, Backing	6-8	15	D.C.	1.69	S-8	C
89	Dome & Panel	12-16	6	S.C.	0.46	G-6	C
90	Dome & Panel	12-16	6	D.C.	0.46	G-6	C
1000	Head (2 filaments) depressible beam	6-8	32 } 32 }	D.C.	3.79 } 3.79 }	S-10	C
1110	Head (2 filaments) depressible beam	6-8	21 } 21 }	D.C.	2.46 } 2.46 }	S-10	C
1114	Head (2 filaments) depressible beam	6-8	21 } 21 }	D.C.	2.62 } 2.62 }	S-10	C
	<i>Read foot-note before installing.</i>						
1116	Head (2 filaments) depressible beam	6-8	32 } 21 }	D.C.	4.09 } 2.66 }	S-10	C
1118	Head (2 filaments) depressible beam	6-8	32 } 21 }	D.C.	3.89 } 2.62 }	S-10	C
	<i>Read foot-note before installing.</i>						
1129	HEAD, SPOT, STOP	6-8	21	S.C.	2.36	S-10	C
1130	HEAD, SPOT, STOP	6-8	21	D.C.	2.36	S-10	C
1133	HEAD, SPOT, STOP	6-8	32	S.C.	3.68	S-10	C
1134	HEAD, SPOT, STOP	6-8	32	D.C.	3.68	S-10	C
1141	Head & Spot	12-16	21	S.C.	1.16	S-10	C
1142	Motor Coach	12-16	21	D.C.	1.28	S-10	C
1143	Head & Spot	12-16	32	S.C.	1.71	S-10	C
1144	Head & Spot	12-16	32	D.C.	2.00	S-10	C
1158	Head for Fords (1921 to 1928)	6-8	21 } 2 }	D.C.	2.46 } 0.64 }	S-10	C
	Also Stop and Tail from 1929 on						
1170	Head for Fords (1921 to 1928)	6-8	21 } 6 }	D.C.	2.65 } 0.90 }	S-10	C
	Also Stop and Tail from 1929 on						
1172	Head for Fords (1921 to 1928)	6-8	32 } 6 }	D.C.	3.89 } 0.90 }	S-10	C
	Also Stop and Tail from 1929 on						
3001	Head for Cadillacs (1932-33)	6-8	21 } 21 } 32 }	T.C.*	2.72 } 2.72 } 4.09 }	S-12	C
3003	Head for Packards (1933)	6-8	32 } 32 } 32 }	T.C.*	4.10 } 4.10 } 4.10 }	S-12	C

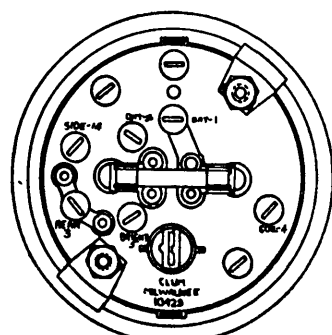
*Triple contact.

IMPORTANT: Mazda lamps Nos. 1000, 1110, and 1116 are interchangeable. Automobiles equipped with depressible beam headlights (sometimes called "Tilt-Ray" or "Bifocal" head lights) are usually delivered with the 21-21 C.P., No. 1110 bulbs as original equipment. If higher C.P. lamps are desired, substitute the 32-32 C.P., No. 1000 lamps, or the No. 1116 lamp. **Under no circumstances use lamps Nos. 1114 or 1118 in these cars.**

Mazda lamps Nos. 1114 and 1118 are designed for use in Ford automobiles (1921 to 1928), originally equipped with the 21-2 C.P., No. 1158 lamps. By substituting either the 1114 or 1118 lamps for the 1158 lamp, the 1921 to 1928 Ford headlights are converted into depressible beam jobs.

The difference between Mazda lamps Nos. 1000, 1110, and 1116, and Mazda lamps Nos. 1114 and 1118 is in the plane of the base pins.

SWITCHES



REAR VIEW CLUMP SWITCH NO 10429

FIG-1

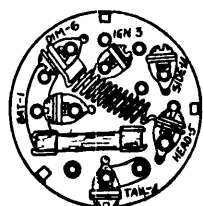
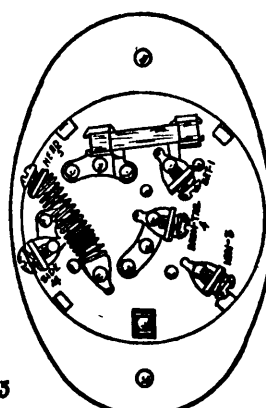
REAR VIEW
CULVER-STEARN'S SWITCH NO 66040

FIG-2



REAR VIEW CULVER-STEARN'S SWITCH NO 4-5000

FIG-3

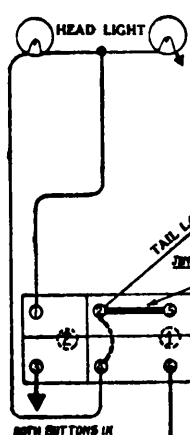


FIG-4

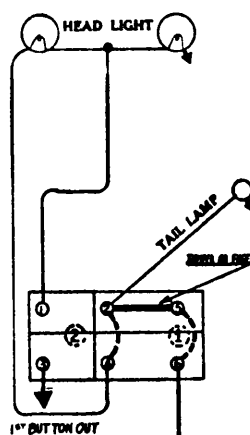


FIG-5

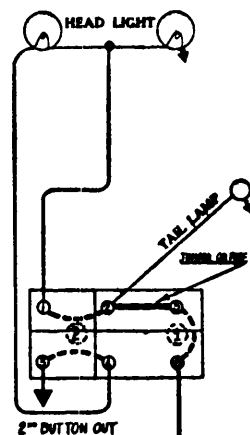


FIG-6

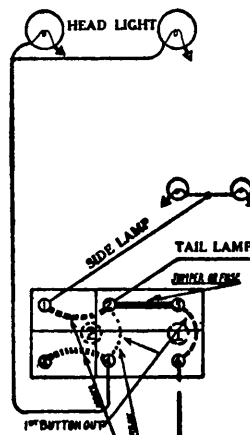


FIG-7

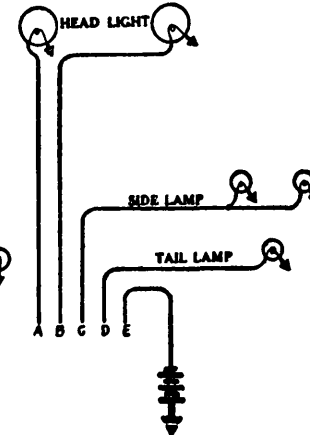


FIG-8

SWITCHES

Figures 1, 2 and 3 illustrate typical combination switches used in automobile work. These switches all work on the same principle.

Figures 4, 5 and 6 represent both the internal and external connections for the CONNECTICUT Type H-ND switch when used for dimming by connecting the head lights in series with each other.

Figure 7 shows the Connections when this same Connecticut switch is used for selecting two set of bulbs. The usual small head lights could, of course, be connected to terminal No. 1 instead of the side lights. Likewise a resistance unit could be inserted between terminals 1 and 3 and the head lights accordingly dimmed in this manner.

A study of these diagrams will illustrate the principle of automobile lighting and more clearly show the result required.

Figure 8 Wires A, B, C, D and E represent the loose ends of any simple auto wiring system and it is assumed that they cannot be identified, and that it is necessary to "ring out" or test same so that the ends may be connected to the proper switch terminals.

FIRST—Locate live battery or feed wire. Assuming a grounded system, take each wire in turn and touch to metallic surface (be sure this surface is clean, as paint or enamel insulates) until a hot, starry spark is secured. This wire is the battery wire and corresponds to wire "E". If battery is

not grounded, touch all wires in rotation until two are found that give hot, starry spark when connected.

SECOND—Having located the live battery or feed wire it is only necessary to touch the wires and note the results. In Figure 8, if wire "A" is touched by wire "E" (the live wire), it will be noted that a circuit is formed and that the left head light will burn. The right head light should be located in like manner. In the case of Figure 6 it will be noted that touching wire "A" will cause both head lamps to burn in series as dim lights. It follows then that this wire should be connected to terminal No. 4 in the case of the Connecticut H-ND switch illustrated. In Figure 7, touching wire "A" results in both head lights burning brightly, which indicates that they are already joined together in parallel.

Wires "C" and "D", and any other wires that may be loose, can be identified in the same manner and should be connected to their respective terminals.

In this manner ANY wiring may be renewed or switch installed.

If switch markings are indistinct a test lamp can be used to locate the respective terminals on the switch. For instance, if the switch in Fig. 1 were to be tested it would "ring out" as follows:

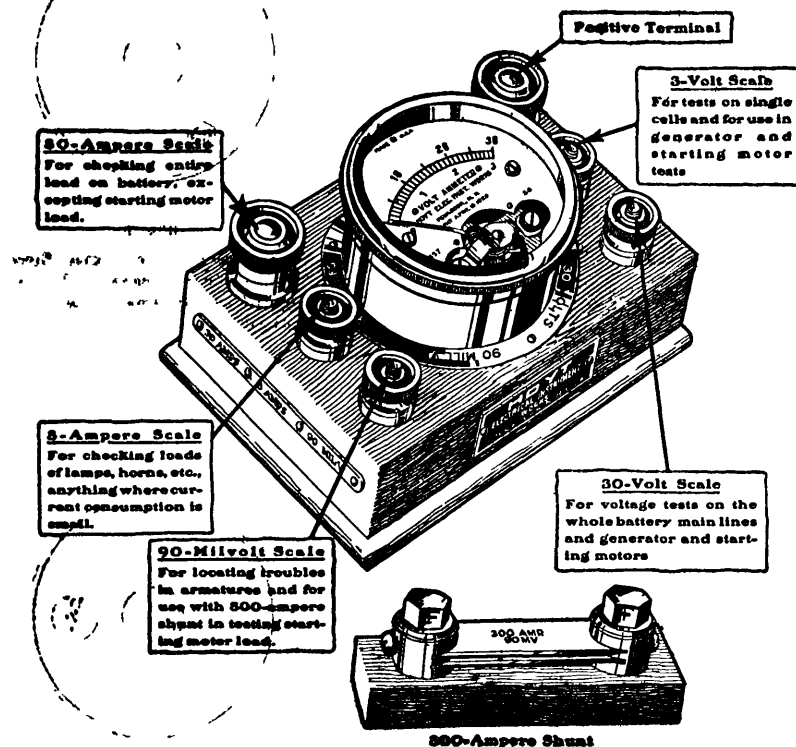
REAR Position, 1-3 connected; DIM, 1-3-6 connected; HEAD, 1-3-5 connected; SIDE, 1-3-14 connected. The "Rear Light" terminal can be easily identified by noting that it is connected in every position. The other terminals should be connected as indicated by the respective switch positions.

CHARGING RATES

ADJUSTING CHARGING RATES ON GENERATORS USING THIRD BRUSH REGULATION.

A.—DIRECTION TO MOVE BRUSH: In all cases, moving third brush in direction of rotation increases generator output; moving against direction of rotation decreases output.

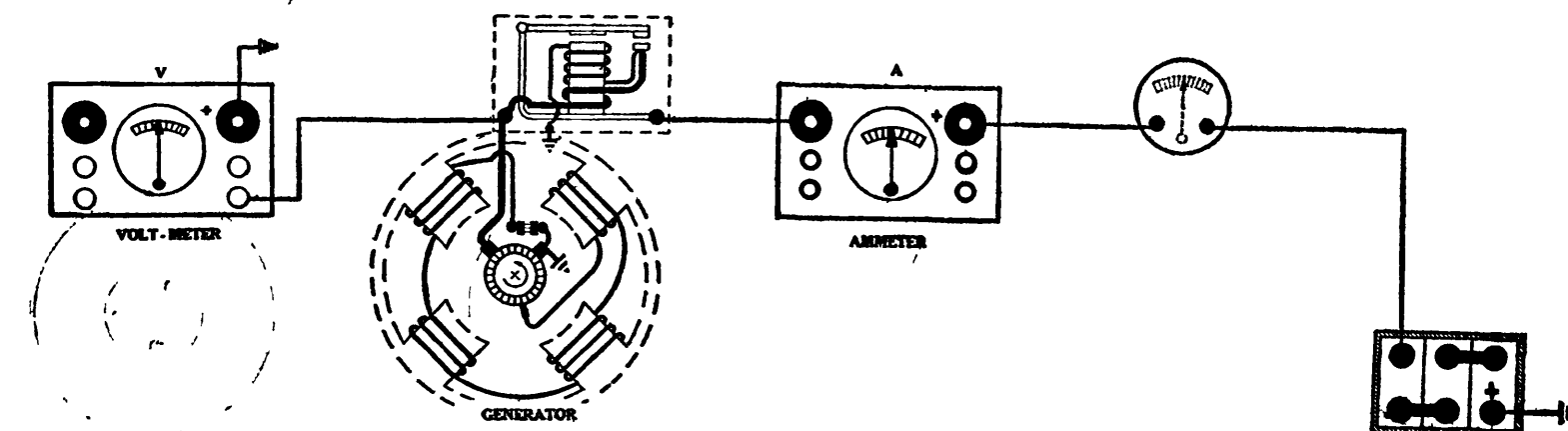
B.—MECHANICAL DIFFERENCES: The method employed by various manufacturers to accomplish this movement differs. In some generators the third brush and mounting plate are acted upon directly, in which case no mistake in direction will be made providing the armature rotation has been previously ascertained. In other generators the motion is transmitted by means of levers or thru rack and pinions. In the latter cases, care should be exercised that the resulting third brush motion is as desired.



C.—CHECKING TERMINALS: Before adjusting charging rate, check all terminals (especially battery positive post, which is subject to corrosion) to make sure they are absolutely tight. See that cable connection from battery to car frame is clean and tight.

D.—SHORT GROUND WIRES: On some cars where the ground lead is short this connection will give considerable trouble, especially if the battery has been loose in cradle. The bolt holding terminal to frame should be removed and both terminal and frame scraped before replacing. This condition usually is accompanied by the frequent burning out of headlight bulbs.

E.—RELIABLE INSTRUMENTS: It is very important when making adjustment of charging rates that a reliable Ammeter (A) be used in series with the generator and charging line, and a reliable Voltmeter (V) be connected between the generator terminal and ground, as indicated in the diagram.



F.—Charging rates should be set in accordance with the following tabulation:

Condition of Battery	Approx. Specific Gravity (Hydrometer)	Generator Volts (B)	Generator Ampere (A)	Generators should be set at these values when temperature of machine is between 60 and 100 degrees Fahrenheit.
Discharged	0			
20 % charged	1.212	6.5	8 to 10	
50 %	1.220	7.0	9 to 11	
75 %	1.245	7.5	10 to 12	
100 %	1.275	8.0	11 to 13	

Under no condition adjust generator when battery is below 25 % charge. Batteries below 25 % should be removed from the car and fully recharged and the generator charging rate adjusted under the 100 % battery condition. Charging rates in EXCESS to those given in the tabulation will result in excessive battery voltages and short LAMP LIFE.

THIRD BRUSH ADJUSTMENTS

Moving Third Brush in Direction of Rotation Increases Output; Against Direction of Rotation Decreases Output.

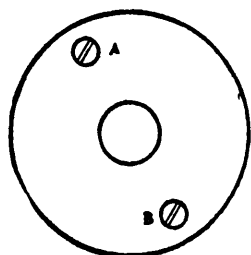


Fig. 1.

Not Necessary to Loosen Cover Band. Loosen bottom locking screw (b) and adjust by turning top screw (a). Relock.

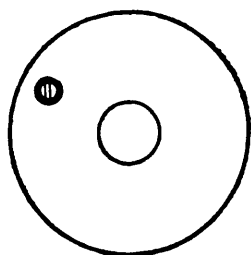


Fig. 2.

Not Necessary to Remove Cover Band. Loosen screw in center of knurled nut. Adjust by turning knurled nut. Relock.

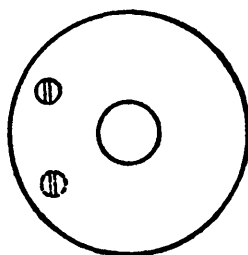


Fig. 3.

Loosen Cover Band. Loosen filister head locking screw to left of oil cup. Shift third brush by hand. Tighten screw.

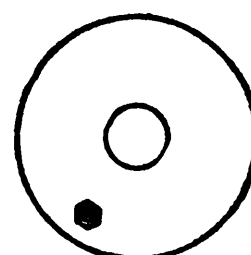


Fig. 4.

Not Necessary to Loosen Cover Band. Loosen locknut "L" and adjust by turning screw "G". Relock.

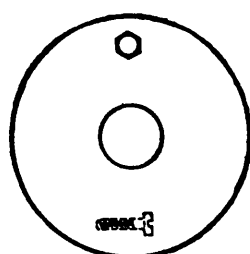


Fig. 5.

Loosen Cover Band. Loosen hex. locknut. Shift third brush by turning adjusting screw. Relock.

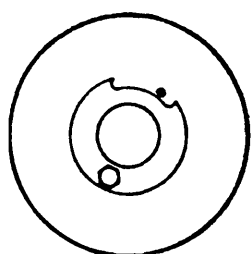


Fig. 6.

Not Necessary to Remove Cover Band. Loosen hex. head locking stud. Shift plate by hand. Relock.

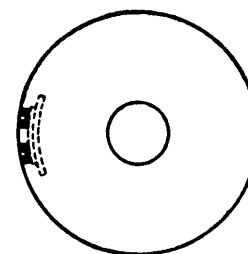


Fig. 7.

Loosen Cover Band. Loosen the two screws in third brush arm mounting bracket one or two turns. Shift brush arm and tighten screws.

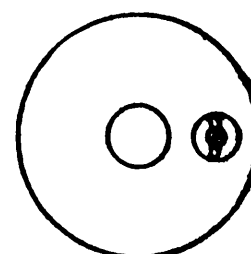


Fig. 8.

Not Necessary to Remove Cover Band. Remove small plate on end housing. Loosen small locking nut and adjust by moving stud in slot. Relock.

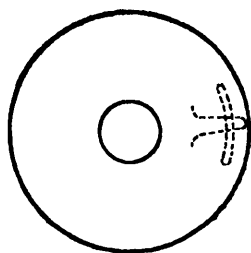


Fig. 9.

Loosen Cover Band. Shift third brush mounting plate by means of extension handle on it. Plate is held in any position by friction clamp washers.

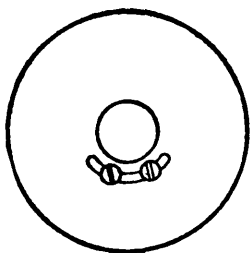


Fig. 10.

Not Necessary to Remove Cover Band. Loosen two filister head screws. Shift third brush by moving screws in slot. Tighten screws.

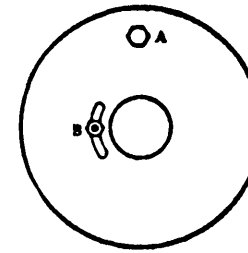


Fig. 11.

Loosen Cover Band. Loosen two hex. head screws and shift third brush by hand. Tighten screws.

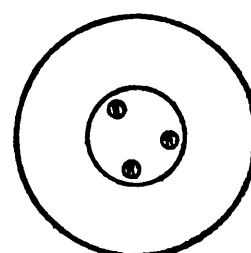


Fig. 12.

Loosen Cover Band. Loosen the three screws in the bearing retainer plate (on commutator end of generator) one or two turns. Shift third brush mounting plate by hand. Tighten screws.

THIRD BRUSH ADJUSTMENTS

(continued)

Moving Third Brush in Direction of Rotation Increases Output; Against Direction of Rotation Decreases Output.

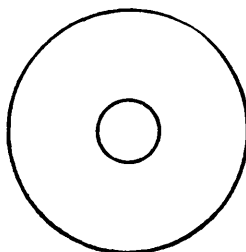


Fig. 13.

Loosen Cover Band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

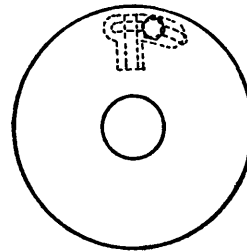


Fig. 14.

Loosen Cover Band. Loosen hex. nut which clamps brush mounting to end housing. Shift by hand. Relock.

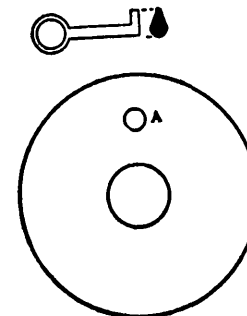


Fig. 15.

Not Necessary to Loosen Cover Band. Insert special Bosch wrench thru hole above oil cup. Shift by turning wrench. Mounting plate held in position by friction clamp washers. This adjustment can be made without wrench by loosening cover band and shifting third brush by hand.

Note: Same Bosch end frame as Fig. 18 excepting screw left out. This change made about March, 1925.

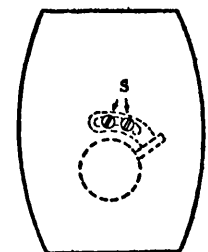


Fig. 16.

Loosen Cover Plate. Loosen two screws in third brush arm one or two turns. Increase or decrease length of arm. Tighten screws. Reseat brush with 00 sand paper.

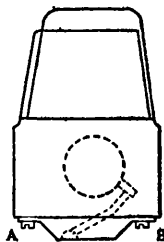


Fig. 17.

Not Necessary to Loosen Cover Plate. Loosen two screws, "A" and "B", in third brush plate below commutator. Shift plate. Tighten screws. Reseat brush with 00 sand paper.

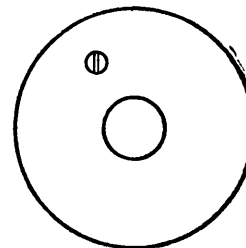


Fig. 18.

Not Necessary to Loosen Cover Band. Shift brush by turning small screw over oil cup.

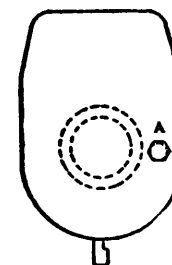


Fig. 19.

Loosen Cover Plate. Loosen third brush plate adjusting screw "A" one or two turns. Shift plate by hand. Tighten screw.

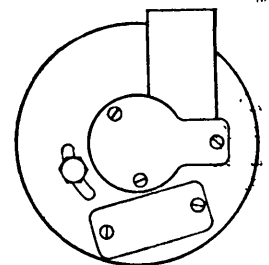


Fig. 20.

Not Necessary to Loosen Cover Band. Loosen hex. nut and move in slot. Relock.

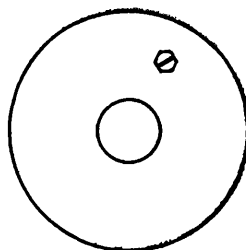


Fig. 21.

Not Necessary to Loosen Cover Band. Shift third brush by turning hex. headed screw.

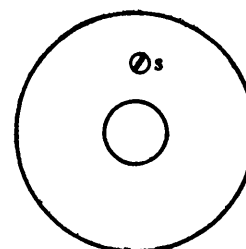


Fig. 22.

Loosen Cover Band. Loosen locking screw "S" which releases brush mounting plate. Shift by hand. Relock.

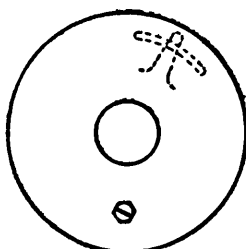


Fig. 23.

Loosen Cover Band. Loosen hex. headed locking screw which releases brush mounting plate. Shift third brush by means of extension handle. Relock.

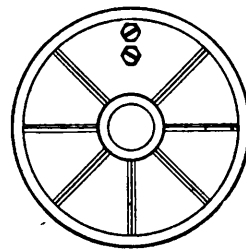


Fig. 24.

Not Necessary to Loosen Cover Band. Loosen Hex. Head Lock Screw. Shift third brush by turning other Hex. Head Adjusting Screw. Relock.

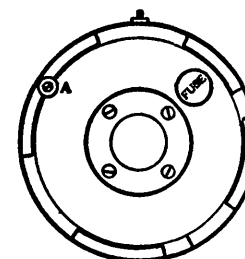


Fig. 25.

Remove cover cap. Shift third brush by turning adjusting screw (A).

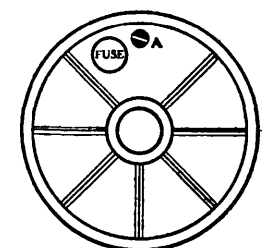


Fig. 26.

Not necessary to loosen cover band. Adjusting Screw "A" moves entire brush rig. Third brush cannot be moved without changing position of main brushes.

GENERATORS

AMERICAN BOSCH GENERATOR

Type 1052-4 inch, Form F.

Rotation, L. H., Com. End

Performance Data—Gen. cold; hot test approx.
2-3 amps. lower.

Amps.	R. P. M.	Volts
0	420	6.
5	700	7.
10	1000	7.3
13.5	1600	7.5

FIELD CURRENT—2.2 amps. at 6 volts.

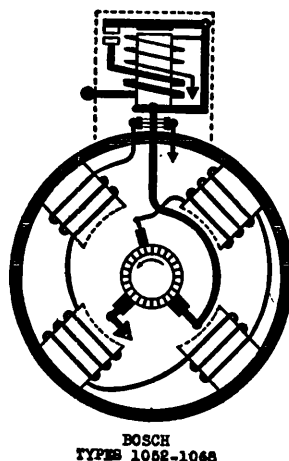
FIELD FUSE—5 amps.

RUNNING FREE—5 amps. max. at 6 volts.

STALL CURRENT—17-20 amps. at 6 volts.

BRUSH TENSION—1 to 1 1/4 lbs. on each.

THIRD BRUSH ADJUSTMENT—Not necessary to loosen cover band. Early 1925: See Fig. 18, p. 7, Sec. AA. Late 1925: See Fig. 15, p. 7, Sec. AA. Important: Before making adjustment, read paragraph "F", p. 5, Sec. AA.



AMERICAN BOSCH GENERATOR

Typ 1068-4 inch, Form J

Rotation, L. H., Com. End

Performance Data—Gen. cold; hot test approx.
2-3 amps. lower.

Amps.	R. P. M.	Volts
0	415	6.
4.5	700	7.
10	1000	7.3
13.6	1600	7.5

THIRD BRUSH ADJUSTMENT—Not necessary to loosen cover band. Early 1925: See Fig. 18, p. 7, Sec. AA. Late 1925: See Fig. 15, p. 7, Sec. AA. Important! Before making adjustment, read paragraph "F", p. 5, Sec. AA.

FIELD CURRENT—3.4 amps at 6 volts. Fuse—5 amps.

RUNNING FREE—6.0 amps. at 6 volts.

STALL CURRENT—18-22 amps. at 6 volts.

BRUSH TENSION—1 1/4 lbs. on each.

NOTE: For details Bosch Armature Assembly, see p. 10, Sec. AA.

DELCO STABILIZING FIELD GENERATORS

Models Nos. 290, 295, 296, 299, 303, 308, 315, 324, 325

TYPE—Four-pole, shunt wound, 3rd brush regulation in combination with stabilizing field. Two of the coils are connected directly across the main brushes and are known as the STABILIZING FIELD. They are wound with comparatively fine wire, the resistance being about three times that of the ordinary Delco field. The other two coils (wound with larger wire) are connected between the insulated brush and 3rd brush and are known as the THIRD BRUSH FIELD. The polarity of pole pieces is same as ordinary 4 pole job, that is N-S-N-S.

OPERATION—In order to clearly understand the operation of this type generator it is necessary to consider separately (1st) the electrical characteristics of a straight shunt generator; (2nd) those of a 3rd brush regulated generator; and (lastly) the result of combining the two. It will be recalled that the output of a shunt generator increases in direct proportion to its increase in speed. This is the function of the stabilizing field; however, the size of the field wire offers a certain resistance and the out-put is held to a predetermined amount. In the case of a 3rd brush regulated generator the current out-put increases rapidly until a peak or maximum rate is reached, while a further increase in speed results in the falling off of the charging rate. By combining the two types in one unit, the current out-put is held more constant over a greater range of engine speeds.

ADJUSTMENT—Due to the fact that but two field coils are affected by changing the 3rd brush position, a very fine adjustment can be made which will not change due to the seating of brushes. This is not the case on the ordinary 4 pole 3rd brush regulated machine where the distance through which the 3rd brush can be moved is small and the slightest movement effects a comparatively large increase or decrease in the out-put.

LOCATING TROUBLE—Should generators of this type develop trouble with low charging rate it is a simple matter to determine which field is at fault. While running hot at 1600 R. P. M., maximum out-put should be 12 amps. Should either field be open or cut out, and the other "O.K." the out-put will drop to 4 amps. Run generator in test bench at 1600 R. P. M., lift 3rd brush. If out-put drops to zero the STABILIZING FIELD is open. If out-put does not change the THIRD BRUSH FIELD is open.

GENERATOR CHARACTERISTICS

Rotation, L.H., Com. End

PERFORMANCE DATA—Gen. hot; add 3 amps. for cold test.

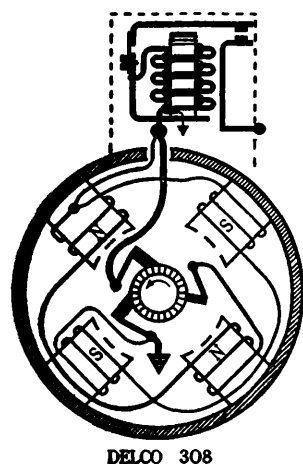
	Ampere	R. P. M.
Min.	5	800
Max.	12	1600
Average	10-12	

THIRD BRUSH ADJUSTMENT—LOOSEN COVER BAND. See Fig. 9, p. 6, Sec. AA.

MOTORING FREELY—5-6 amperes at 6 volts. STABILIZING FIELD TEST—1 amp re at 6 volts.

MAX. STALL CURRENT—15 amperes at 6 volts. THIRD BRUSH FIELD TEST—3.25 amperes at 6 volts.

BRUSH SPRING TENSION—1-1/4 to 1-1/2 lbs. on each.



DELCO DISTRIBUTORS

DISTRIBUTORS EMPLOYING SINGLE CAM WITH INDEPENDENT BREAKER ARMS.

A.—This type of distributor was first used on the 60-120 degree "Vee" engines (Lincoln and Wills Sainte Claire) and later on "Straight Line" Eights. It is now found on 90 degree "Vee" eights. In some cases two coils are used with the double track distributor head; while in other cases but a single coil and standard head is employed.

B.—The two sets of breaker arms must be ACCURATELY LOCATED to operate at intervals of exactly 30 and 60 degrees of distributor shaft travel, corresponding to 60 and 120 degrees on the flywheel, which are the intervals of crank shaft travel between cylinder firings in the 60 degree "Vee" Eights; and at intervals of exactly 45 degrees of distributor shaft travel, corresponding to 90 degrees on flywheel, which are the intervals of crank shaft travel between cylinder firings in the "Straight Line" Eights and 90 degree "Vee" Eights.

C.—This adjustment is made by slightly moving the "CONTACT POINT MOUNTING PLATE". On early models this plate is shifted within small limits after first loosening the three screws (A, B, C—Fig. 1) securing it to distributor housing, and allowing plate to pivot on screw (A) nearest oiler. On later models an ECCENTRIC ADJUSTING SCREW (B) is provided which moves but one breaker assembly after loosening screws A and C (Fig. 2).

TEST LIGHT AND TEMPLET

D.—In order to accurately locate the relative position of the breaker arms it is necessary to use a 6-volt test light in ignition circuit and a special templet calibrated in degrees (Fig. 3).

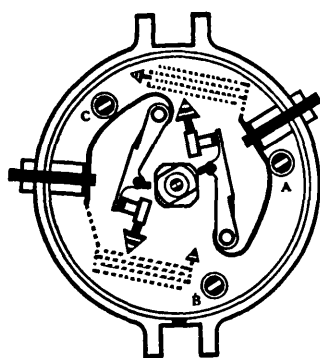


Fig. 1
Lincoln Distributor,
Delco No. 5226

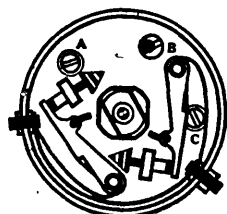


Fig. 2
Cadillac Distributor,
Delco No. 5281

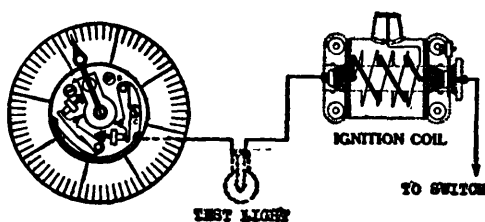


Fig. 3
Test Light connected IN SERIES with Coil and Breakers;
templet in position. (Light goes out when points open.)

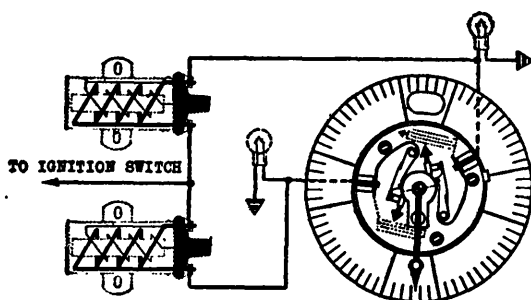


Fig. 6
Test Lights Connected IN PARALLEL WITH BREAKERS
(Test Light lights when points open.)

E.—Specifications for 60-120 degree and 45 degree Templets. 60-120 degree: (Fig. 4) This templet is made of $\frac{1}{8}$ inch sheet brass, outside diameter, 7 inches; inside diameter $4 \frac{1}{16}$ inches with a slot $\frac{3}{8} \times \frac{1}{8}$ inches cut in inside circle for locating first firing position. A slot is also cut that templet may fit over distributor oil cup. The degree marks may be spaced on a lathe, after chucking blank disc, use teeth on large cone gear as a dividing head. The marks are cut by moving a sharp tool, accurately centered in tool post, across face of disk using the hand cross feed. A standard rotor button is used for mounting pointer, first removing brush and brush spring.

45 degree: (Fig. 5) The templet for this type distributor may be made as explained above using following dimensions: Outside diameter, $6 \frac{1}{8}$ inches; Inside diameter, $3 \frac{1}{8}$ inches. It is not necessary to cut slots in this templet.

F.—The 60-120 degree distributor requires the use of two 6-volt test lights to accurately check timing. These may be connected in series with coil and points as shown by Fig. 3, or in parallel with points as shown by Fig. 6.

G.—The advantage of the parallel method of connecting lights over the series is in the fact that it is unnecessary to break connections to make a test, while with the series method the low tension wires between coils and distributor must be disconnected and lights connected in series with circuit.

H.—An important point to be remembered is that in the case of series connection the test lights will GO OUT when CONTACTS OPEN (firing position); while with the parallel connection the test lights WILL LIGHT when contacts open (firing position) as current no longer is "shunted off" thru points but must pass thru lights.

L.—TO MAKE TEST:

- 1.—Remove car distributor head and rotor button.
- 2.—Adjust each of the two sets of contact to the dimension of .025 to .028 inch.
- 3.—Place templet and pointer in position.
- 4.—Connect lights and turn ignition switch "ON".
- 5.—By using hand crank slowly turn engine until light indicates point has opened.
- 6.—Rotate templet slightly until heavy degree mark is directly under pointer. (This is the purpose of slot on inside hole of templet.)
- 7.—Continue to slowly turn engine until light indicates other point has opened.
- 8.—Note position of pointer which should be directly over heavy degree line.
- 9.—If adjustment is out, rectify as explained in paragraph "C" on this page.

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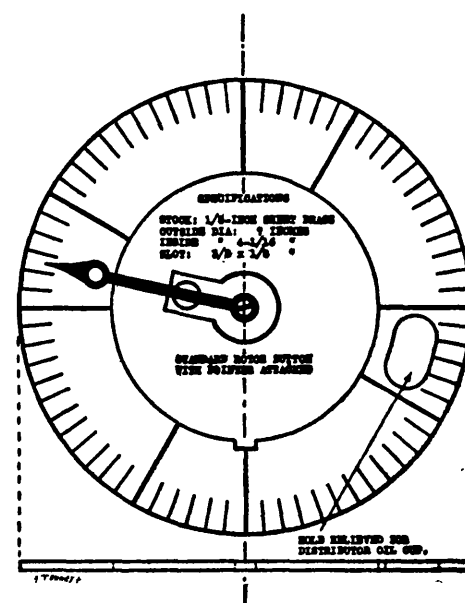


Fig. 4
Templet for Lincoln and Wills Sainte Claire

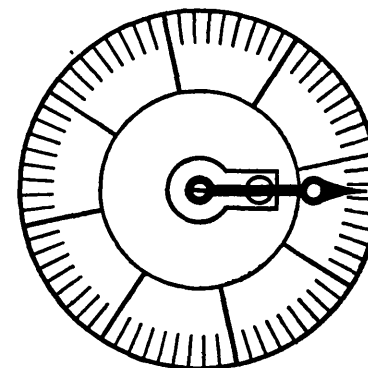
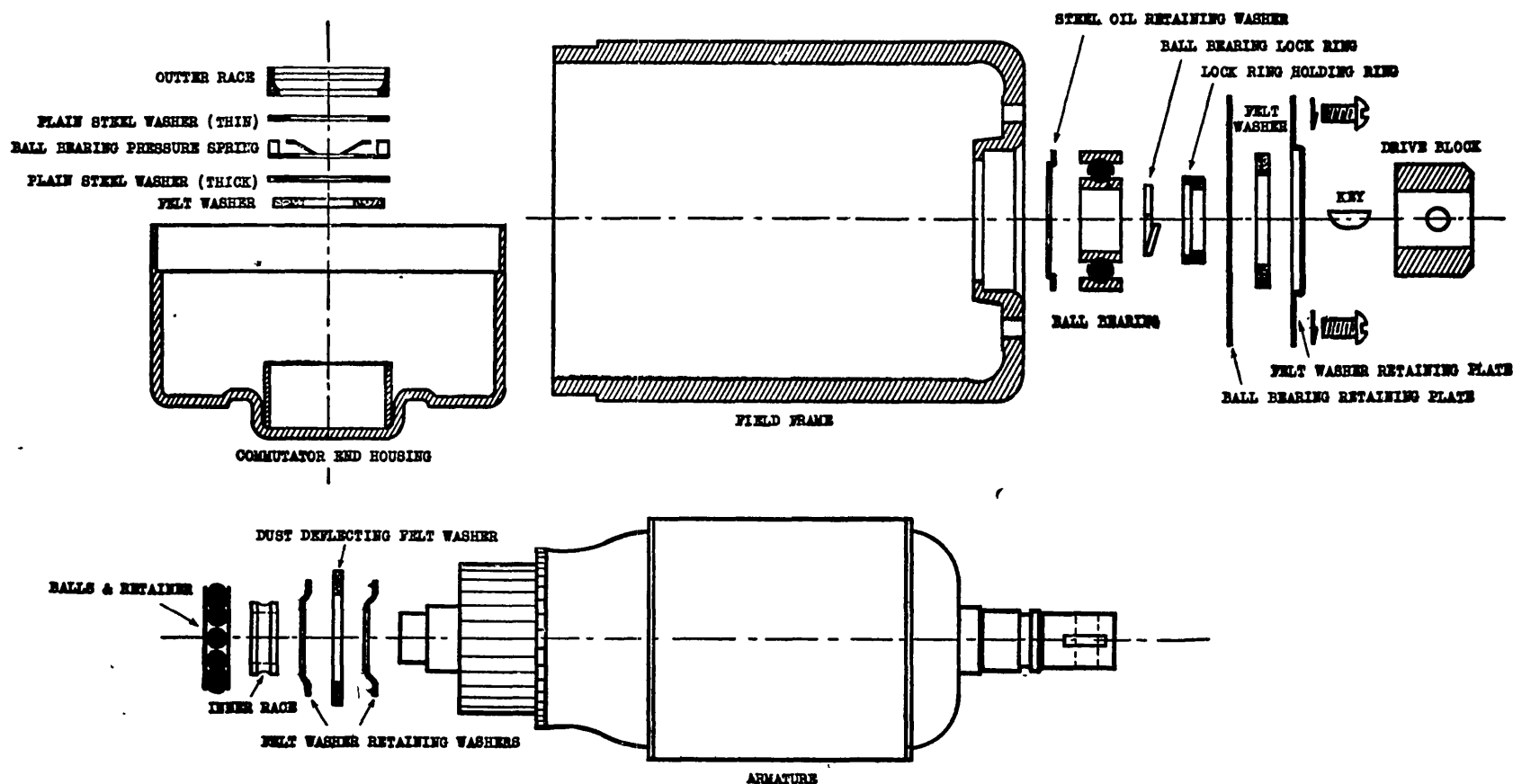


Fig. 5
Templet for Diana, Cadillac, etc.

BOSCH GENERATORS

DETAIL OF ARMATURE AND BEARING ASSEMBLY



In assembling Bosch Generators the parts should be separated into three distinct groups as shown above, then proceed as follows:

- 1st—Assemble commutator end bearing and washers.
- 2nd—Place armature in field frame and assemble drive end bearing and washers, etc.
- 3rd—Assemble felt washers, spring, and outer race in end housing. By use of two short copper tubes to guide "commutator end plate fastening screws," and wire hooks to hold back brush arms, fit end housing to frame.

BOSCH STARTING MOTORS

BENDIX DRIVE FOR TYPES—940-944-946-948-964—USED ON ESSEX CARS

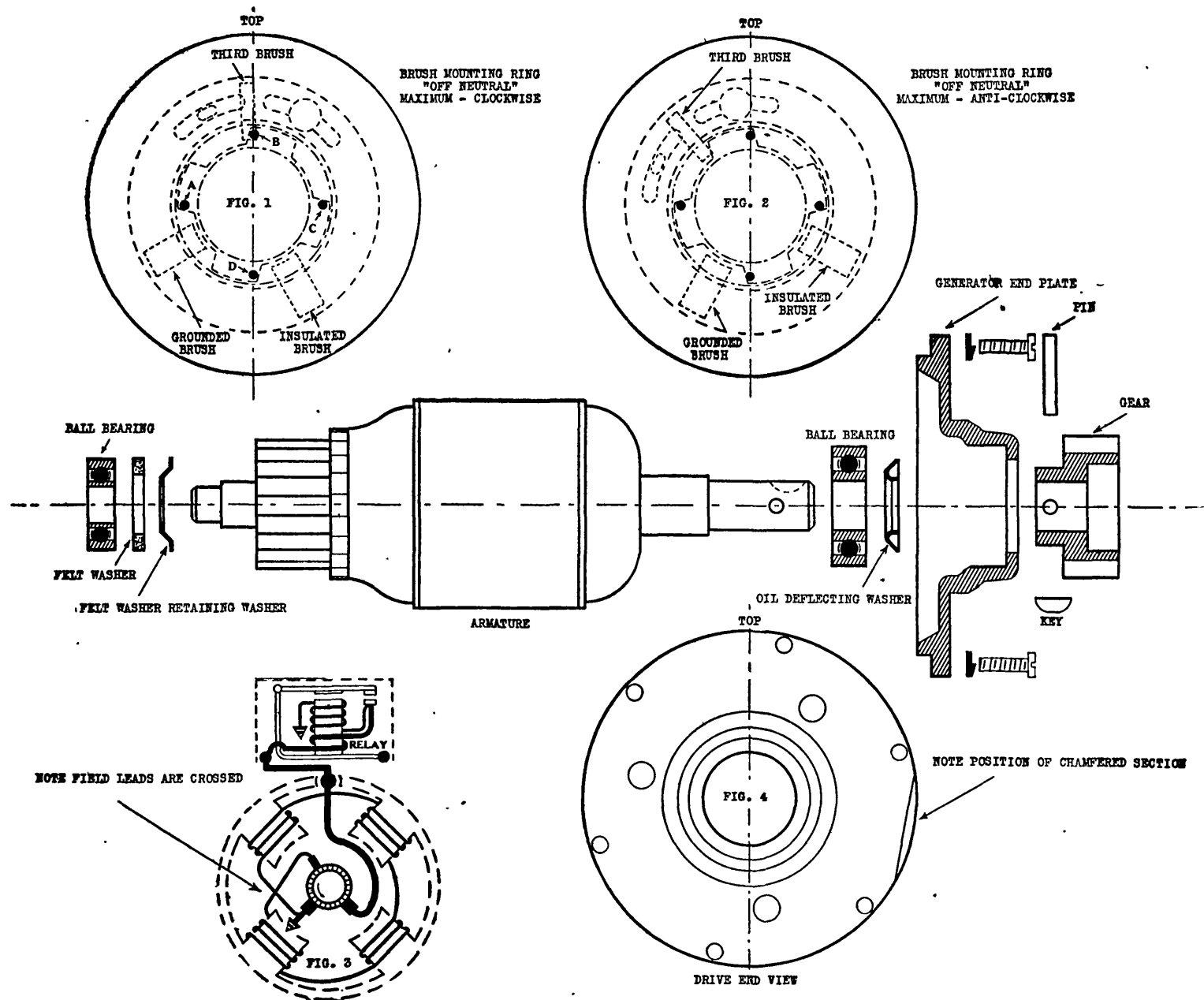
Two different types Bendix drives are used on Essex Cars. The **First Type Drive** uses a ten-toothed pinion with **One Eccentric Weight** $\frac{3}{16}$ inch thick. This drive also carries an extra long stop nut or collar, making over all length of drive $5\frac{5}{8}$ inches.

The **Second Type Drive** uses a ten-toothed pinion. However, the pinion itself is $\frac{1}{4}$ inch longer than first type and carries **Two $\frac{3}{16}$ inch Eccentric Weights**. This drive has an over-all length of $5\frac{1}{2}$ inches, the stop nut or collar measuring but $\frac{1}{2}$ inch.

While it is mechanically possible to assemble the new type drive on the first Bosch Starting Motors employing the $5\frac{5}{8}$ inch drive, these **Drives Are Not Interchangeable** for the reason that installation of new drive on old starter will cause interference. This drive would prevent full meshing of pinion and might cause complete destruction of Bendix drive and possibly damage to other engine parts.

It therefore follows that on Bosch Starting Motors Types 940-944-946, the first type drive with single eccentric weight should be used; while on Motors 948 and 964 the second type drive with double counter weights should be used.

MODEL "T" FORD GENERATORS



MOVING BRUSH MOUNTING RING.

The entire BRUSH RING ASSEMBLY may be moved thru an arc of 30 degrees. To do this it is necessary to—1, Remove cover band; 2, Loosen (but not remove) the four small screws on commutator end housing; 3, Move entire ring by hand.

Fig. 1 shows mounting ring "Off Neutral" maximum amount in a clockwise direction (viewed from commutator end). The four small screws referred to above are labeled A, B, C, D.

IMPORTANT: Each screw should have a LOCK WASHER under the head. This is very important as the screw will be too long if washer is left off; reaching thru and grounding commutator segments. Bear in mind that locating brush ring in "Neutral Position" has nothing to do with "Third Brush Adjustments", that being another operation by itself. Moving BRUSH MOUNTING RING changes position of all three brushes simultaneously. See Figures 1 and 2.

HOW TO FIND "NEUTRAL POSITION".

To accurately locate ring in proper running position it is necessary to break shunt field circuit. This may be done by lifting the third brush or by disconnecting one end of shunt field from grounded brush.

Connect one terminal of a six volt storage battery to "Main Insulated Terminal" on top of generator. Connect other battery terminal to any part of generator frame. This actually amounts to connecting battery to the two main brushes. With ring off neutral maximum amount clockwise (as shown in Fig. 1), the armature will rotate at a high rate of speed clockwise (viewed from commutator end). With ring off neutral maximum amount anti-clockwise (as shown in Fig. 2), the armature will rotate at a high rate of speed anti-clockwise.

Move ring to a position where armature will not rotate in either direction, altho a slight tendency to rotate in direction generator will be run, (A. C. viewed from com. end), is permissible. Lock the ring in this position. Connect shunt field, and generator is now ready for the test stand for third brush adjustment.

This office has found from repeated trials on standard Ford generators, using factory wound armatures, that neutral position is usually half-way between the two extremes.

SHUNT FIELD CONNECTIONS.

Fig. 3 shows proper connections for shunt field (viewed from commutator end). Note the field leads are crossed. This is absolutely essential on all generators made after 1919, as generator rotation will be changed should leads not be crossed. EXCEPTION: A very few generators were built in 1919 which did not require crossed leads.

Bear in mind one of the first rules on shunt generator operation. "All shunt generators will motorize when connected to a battery. They must be driven in SAME DIRECTION that they motorize in order to generate."

ARMATURE END PLAY.

Generators after long usage will develop armature end play. The proper method to eliminate this is to rebuild, using new end frames and bearings. It is not advisable to remove end play by use of washers. On jobs not requiring a thoro overhaul the end play may be taken out by peening the commutator end frame in four places around the bearing housing. This will force the shoulder against the outer race of small ball bearing.

BATTERIES

Make of Battery	Battery Types	Amperes for 20 Minutes	Hours at 5 Amps Discharge	Length	Width	Height
EXIDE	3-XC-13-1	98	17	9-1/8	7-3/8	9-1/8
	3-XC-15-1	114	20	10-1/4	7-3/8	9-1/8
	6-XC-9-1	65	10	12-7/16	7-5/16	9-1/8
	3-XX-15-1	114	20	10-1/4	7-3/8	9-1/8
	3-LXRV-15-2G	137	26	20-7/16	5-1/2	8-3/4
	6-LXW-7-1	62	10	12-7/16	7-5/16	9-3/8
GOULD	BSL-6-17	117	24	10-1/4	7-5/16	9-7/8
PREST-O-LITE	A-6-17-SH	170	32	13	7-5/16	9-3/4
	A-6-13-SHK	130	22-1/2	10-3/8	7-5/16	9-3/4
	A-6-17-SHK	170	32	13	7-5/16	9-3/4
	6-13-JFKA	102	17	9-1/8	6-3/4	9-1/8
	6-15-JFKD	120	20	10-7/16	6-3/4	9-1/8
	6-13-JFK	102	17	9-1/8	6-3/4	9-1/8
	6-15-JFK	120	20	10-7/16	6-3/4	9-1/8
	6-13-RHK	115	20	10-3/8	7-5/16	9-1/8
	6-15-RHK	135	24	11-11/16	7-5/16	9-1/8
	6-17-RHK	152	27	13	7-5/16	9-1/8
	6-11-SHK	110	18-1/2	9-1/16	7-5/16	9-3/4
	6-13-SHK	130	22-1/2	10-3/8	7-5/16	9-3/4
	6-15-SHK	150	27	11-11/16	7-5/16	9-3/4
	6-17-SHK	170	32	13	7-5/16	9-3/4
U. S. L.	3-CVF-5X	96	17	9-1/8	7-1/4	9-1/4
	3-CVF-6X	115	21	10-7/16	7-7/16	9-1/4
	3-HVB-8Z	170	33	20	5-3/16	9-3/4
	3-HVF-5X	105	18-1/2	9-1/8	7-7/16	9-3/4
	3-HVF-6X	127	23-1/2	10-7/16	7-7/16	9-3/4
	3-HVX-5X	105	18-1/2	9-1/8	7-7/16	9-3/4
	3-HVX-5X5	105	18-1/2	9-1/8	7-7/16	9-3/4
	3-HVX-8X	170	33	13-1/16	7-7/16	9-3/4
	XY-13	86	17	9-1/8	7-1/4	9-1/4
	XY-13X	86	17	9-1/8	7-1/4	9-1/4
	XY-15	115	20	10-7/16	7-7/16	9-1/4
WESTINGHOUSE	6-OB-13	114	20	10-3/8	7	9-3/16
WILLARD	CRR-15	114	20	10-5/16	7-1/4	9-1/4
	CRR-19	146	27	12-7/8	7-1/4	9-1/4
	CWR-13	98	17	9-3/16	7-1/4	9-1/4
	CWR-15	114	20	10-5/16	7-1/4	9-1/4
	CWR-17	130	23	11-3/4	7-1/4	9-1/4
	CWR-19	146	27	12-7/8	7-1/4	9-1/4
	CW-13	98	17	9-1/16	7-1/4	9-3/8
	CW-15	114	20	10-1/4	7-1/4	9-3/8
	LWR-13	107 1/2	18-1/2	9-3/4	7-1/4	9-1/4
	SJR-4	125	22	10-3/8	7-7/16	10
	SJR-5	145	26	11-7/8	7-7/16	10
	SJR-26	62	10	12-3/8	7-5/16	10-1/8
	SJRR-4	125	22	10-7/16	7-1/4	9-13/16
	SJRR-5	145	26-1/2	11-11/16	7-1/4	9-13/16
	SJRR-6	166	30-1/2	13-1/4	7-1/4	9-13/16
	SJRRN-4	125	22	10-7/16	7-1/4	9-13/16
	SJRRN-5	145	26-1/2	11-11/16	7-1/4	9-13/16
	SJRN-6	166	30-1/2	13-1/16	7-7/16	10

Note: Due to change from wood to rubber cases, table of Willard box sizes only good up to 1926. For later sizes see diagrams 1927 and on.

DISTRIBUTORS

DELCO-REMY HIGH SPEED DISTRIBUTORS

Six cylinder distributors with three lobe cams and eight cylinder distributors with four lobe cams.

THEORY OF OPERATION—

Distributors of this type use two breaker arms connected in parallel (see Fig. 1), with a four lobe cam for an eight cylinder engine, and a three lobe cam for a six; however, but a single coil and but one condenser is used. The cam is so designed that one point is open when the other is just breaking but closes a few degrees after the break occurs. It is this quick closing which lengthens out the time interval (or number of degrees per revolution) that the points are together that makes it possible for the core of the ignition coil to again become magnetized and thoroughly saturated before the next break takes place.

With the old style eight lobe cam with but a single arm, after the break takes place, the "cam follower" must go up over the lobe of the cam and down the other side before the points again close. This cuts down the time points could be together, causing ignition to become weaker and weaker as the speed is increased. The difference between the new and old types of distributors can readily be seen by comparing the two ignition diagrams, (Figs. 2 and 3). Fig. 2 shows the diagram of a Model 658-C distributor. The heavy lines denote intervals when points are together and current flowing in primary. The sum total of the degrees in which the points are together in Fig. 2 are 272 against 208 in Fig. 3.

In the case of the old type breaker the interval between breaks was determined by the position of the lobes on the cam. With an eight lobe cam a break occurred every 45 degrees of distributor shaft travel, corresponding to 90 degrees flywheel travel. With the high speed distributors, however, which make use of two sets of points, a set taking care of four of the cylinders, the arms must be accurately located that the breaks will occur at the correct intervals. A special eccentric adjusting screw "A" (see Fig. 1), is provided for making this adjustment and special synchronizing tools must be used.

TO SYNCHRONIZE BREAKER ARMS ON EIGHT CYLINDER DISTRIBUTORS—

One set of contact points is stationary, while the other set may be moved bodily about the cam as a center. The contact separation of the stationary set "L", Fig. 4, should first be adjusted to .022 inch. This is done by first loosening locking screw "B" and turning eccentric screw "C" to proper separation. Relock screw "B". It, of course, is understood that the distributor shaft is turned until the "cam follower" is on a lobe when adjustment is made.

In same manner adjust contact separation of arm "K" using eccentric screw "F" and locking screw "E". Determine the direction of rotation of cam as view from the top. Units 658-A-D-C turn right hand; units 658-B-E left hand. Slip synchronizing tool No. 820738 (see Fig. 5) over cam, locking it with SLIDE pushed thru SHOWING ARROW (when locked) that points in direction shaft turns (top view).

If unit turns right hand turn shaft in this direction until breaker arm "L" just breaks contact. This exact position can be determined by connecting a six volt bulb in series with the breaker at distributor terminal and turning ignition "on". When light goes out break has occurred. Note exact graduation mark on "M" side of synchronizing tool that is in line with point "X", which is the edge of the slot in distributor base rim.

Continue to turn shaft until the same graduation on "N" side of tool is in line with the point "X". Loosen locking screws "G" and "H", turn eccentric screw "A" until arm "K" breaks contact. Recheck by repeating operations. If found to be correct relock screws "G" and "H". Recheck contact separation of arm "K". If found to have changed reset points and repeat synchronizing operation.

For distributors having opposite rotation, proceed as above, excepting for rotation, and align arm "K" with "N" side of synchronizing tool first and "M" side last. The graduations on tool represent flywheel degrees and the distributor must not be out of adjustment more than two degrees on flywheel (or one degree distributor shaft travel).

TO SYNCHRONIZE BREAKER ARMS ON SIX CYLINDER DISTRIBUTORS—

The contact separation adjustment of stationary and movable arms is carried out the same as in the case of the eight cylinder distributor described above. However, refer to Fig. 6 in following the instructions.

The Delco-Remy synchronizing tool No. 820751 (Fig. 7) is held in place by a small "U" shaped spring. Two arrows are stamped on the tool, pointing towards the spring ends. The spring end, which has an arrow pointing in direction of the rotation of the distributor to be adjusted, goes in slot on shaft. Turn distributor shaft until breaker arm "L" just breaks contact (use light in series with ignition) and note exact graduation mark on "M" side of synchronizing tool that is in line with point "X", which is the edge of the slot in distributor base rim. Continue to turn shaft in same direction until same graduation on "N" side aligns with same edge. Loosen locking screws "G" and "H" and turn screw "A" until breaker arm "K" just breaks contact. Recheck by repeating operations. If found to be correct relock screws "G" and "H". Recheck contact separation of arm "K". If found to have changed reset points and repeat synchronizing operation.

The synchronizing operation may also be carried out on a factory built test bench equipped with a primary spark gap, calibrated in degrees. By connecting a test light in series with the breaker the light should burn during the interval that the points are together and go out at the point of break. With a correct adjustment the light should follow the degrees shown in solid black, see Fig. 2.

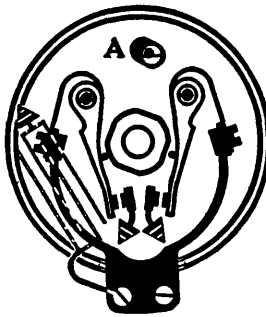


Fig. 1
Delco-Remy 8 cylinder Distributor

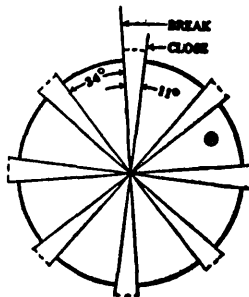


Fig. 2
Ignition diagram, Delco-Remy
Distributor No. 658-C

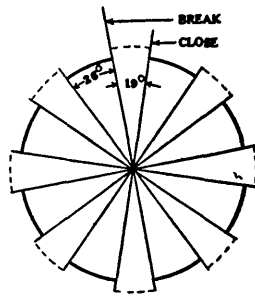


Fig. 3
Ignition diagram of conventional
8 cylinder Distributor with 8 lobe
cam.

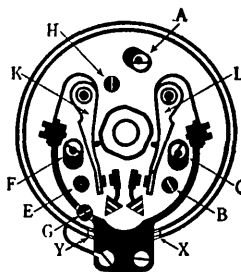


Fig. 4
Adjusting screws on 658 series,
8 cylinder distributors

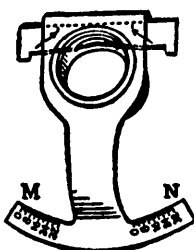


Fig. 5
Synchronizing tool No. 820738, for
8 cylinder Distributor

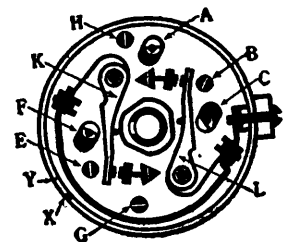


Fig. 6
Adjusting screws on 658-F, 6 cyl-
inder Distributor



Fig. 7
Synchronizing tool No. 820751 for
6 cylinder Distributor

GENERATORS

DELCO-REMY "SPLIT FIELD" GENERATORS, MODELS Nos. 352, 353, 357, 363, 370, 373 and 376.

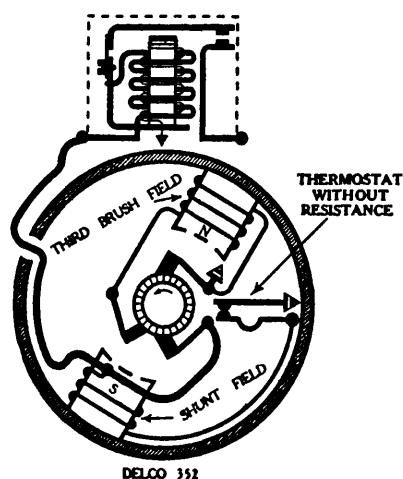


Figure 1

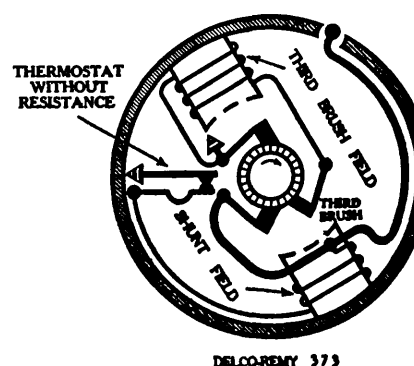


Figure 2

Type. Two pole generators with independent field windings on each pole.

Description. By referring to Figs. 1 and 2 on this page, which show the internal circuits of the Models 352 and 373 generators, it will be seen that the two field windings are entirely independent of one another. One main brush is grounded while the other is insulated and brought out to the cut-out. The lower field winding is shunted directly across the main insulated and grounded brushes thru a thermostat in series with this winding. The thermostat is peculiar in that there is no resistance on it which will be put in series with the field when points are opened. The upper field winding (or third brush field) is bridged across the main grounded brush and the third brush.

Operation. This generator is so designed that a fairly high out-put will be obtained until such time as the generator heats up and the thermostat opens. During this initial period the two field windings are helping one another, or are accumulative. When the generator heats up to a temperature of approximately 185 degrees F. the thermostat opens, cutting out the shunt field, thus leaving but the upper field winding to carry on the work, and making the generator a consequent pole machine. At this point the output will drop about one-third.

Locating Trouble. Should generators of this type develop trouble with low charging rate, it is a simple matter to determine wherein the trouble lies. If it is due to the thermostat points not closing, disconnect wire to thermostat and ground it. If generator then functions O. K. trouble is in thermostat. Should trouble be in third brush field, generator output will fall to zero if thermostat points are manually opened. If both field windings test O. K. trouble then must be in armature.

This unit, like the stabilizing generators described on page 8, Sec. "AA", also has the advantage of having a very fine third brush adjustment which will not change as the brushes seat.

GENERATOR CHARACTERISTICS.

Delco, Model No. 352. Rotation, L. H., Com. End

Performance Data—Gen. Hot. Thermostat Open.

(Thermostat opens at approximately 185 degrees F.)

Amps.	R.P.M.	Volts
0	750	6.5
2	900	6.9
3	1000	7.
6	1200	7.2
9	1500	7.5
13	1800	7.7
14	2000	7.9

Note—On test this generator held 14 amp. output, regardless of speed increase beyond 2000 R. P. M.; not falling off as a conventional third brush machine does.

Motoring Freely—8 amps. at 5.8 volts.

Max. Stall Current—18 amps. at 5.3 volts.

Shunt Field Test—.6 amp. at 6 volts.

Third Brush Field Test—2 7/8 amps. at 6 volts.

Brush Spring Tension—16 on each.

Third Brush Adjustment—See Fig. 20, P. 7, Sec. AA.

ENGINE TIMING CHAINS

While the adjusting and replacing of silent chain drive properly falls within the jurisdiction of the engine repair department of a garage or service station, rather than to the electrical department, for the proper running of an engine, correct valve setting is equally as imperative as correct ignition timing.

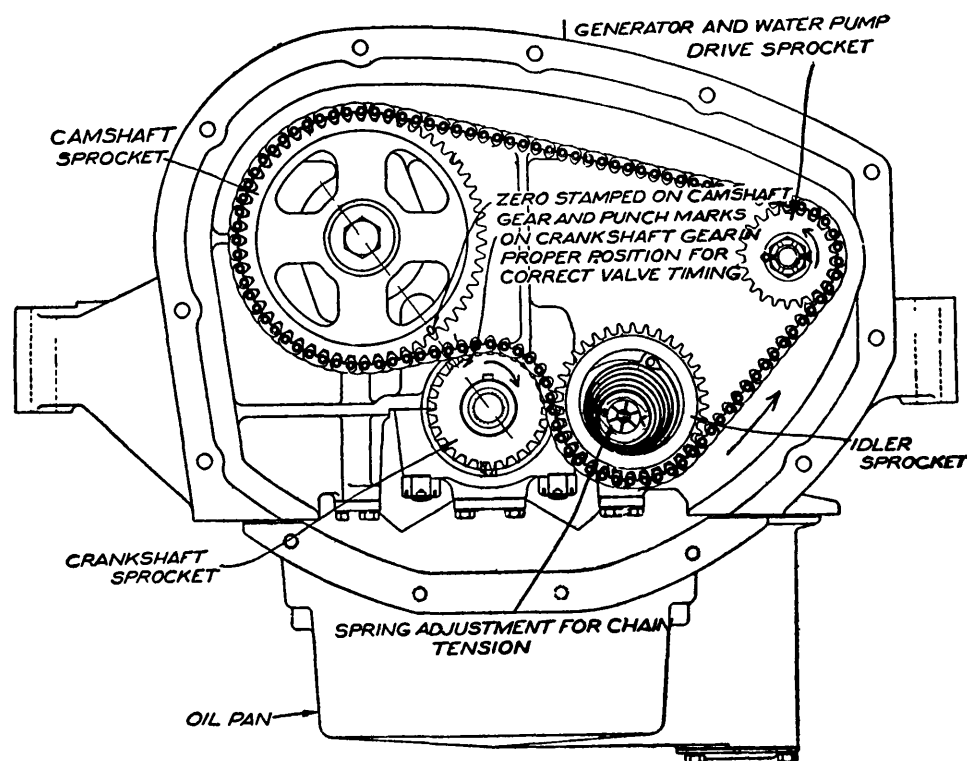


Figure 1

length of one link. Beyond that it is necessary to shorten the chain and bring the adjustment back to the start again.

ADJUSTMENT BY MOVING GENERATOR

This is one of the most common methods found in Group 1. The adjustment is made with the engine running. Loosen the three cap screws which hold generator to timing case and gradually move generator away from engine until a slight humming noise is heard. The generator should then be cautiously moved back towards the engine just enough to cause the noise to cease. At this point retighten the three generator cap screws.

When other methods for manual adjustment are provided, such as eccentric bushings, etc., the procedure follows pretty much the same in all cases. A lock to hold the bushing is provided, which must first be released, and then the chain adjustment made by turning the bushing, usually by a special wrench, until proper chain tension is reached. In cases where an inspection hole or plate is provided the proper tension may be judged by forcing the chain in and out, noting the amount of travel between extremes. Roughly, if the length of chain between sprockets is from 5 inches to 7 inches the total free movement should be $\frac{3}{8}$ inch to $\frac{1}{2}$ inch. From 8 inches to 11 inches the free movement should be $\frac{1}{2}$ inch to $\frac{5}{8}$ inch. In no case should the adjustment be so tight as to cause humming.

TO SHORTEN CHAINS.

When the limit of adjustment is reached it is necessary to take out one link of the chain (or shorten it one pitch). This, of course, requires the removing of radiator and opening up of timing case.

Count the number of links in the chain. If it is made up of an odd number of links one of them is the "hunting link"—see (1), Fig. 2—and the chain may be shortened one pitch by removing this link. Should the chain, however, be made up of an even number of links it will be necessary to take out four links and replace them by three, one of which will be a hunting link.

REMOVING CHAIN.

Count the links and determine how many must be removed, chalk-mark the washers which must be cut, turn the engine until these washers are on a sprocket (preferably the crankshaft sprocket) and with a sharp chisel split the washers. Turn the engine until it is possible to push out the pins (in the case of a Morse chain, first the pins at (5), Fig. 2, and then the rocker pin (3), Fig. 2.

Slipping of the chain invariably throws out both valves and ignition, and while it is comparatively easy to retune the ignition, it not being necessary to replace the chain, the valve setting will still remain out. It then becomes but a question of time before the chain again "jumps a tooth", throwing off the valve setting even more. On the other hand, several engines make use of the generator mounting as a chain adjustment and cars with units of this type naturally look to the station which services the generator to adjust and maintain the front end drive.

For these reasons it is well for every auto-electrician to understand the few simple underlying principles of silent chain maintenance and adjusting, together with a knowledge of valve setting.

ADJUSTMENT OF CHAINS.

Engines may be divided into two distinct groups, depending on what provision is made for taking up the chain slack, due to wear.

GROUP 1. Engines requiring manual adjusting at intervals. The first adjustment should be made after 500 miles and thereafter at intervals of 2500 miles.

GROUP 2. Engines using an automatic chain tightening device. See Fig. 1.

In either group, however, the range of adjustment is generally just enough to take up the

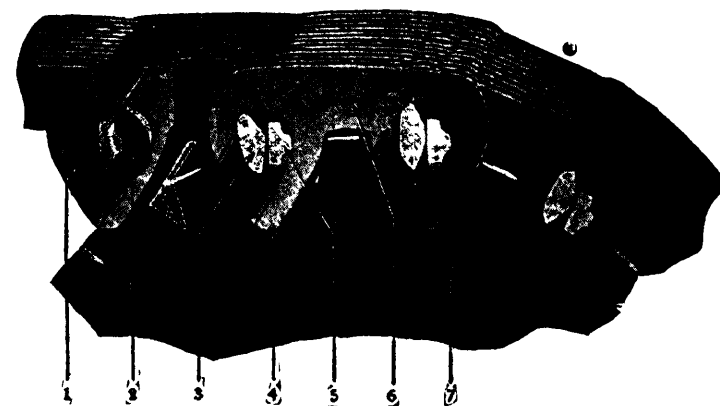


Figure 2

ENGINE TIMING CHAINS

REPLACING CHAIN.

Regardless of the reason for removing the chain, the valve setting should be carefully checked, preferably with a MOTOR GAUGE, before closing up the timing case. The next most accurate method is to check an exhaust valve against piston and flywheel position. However, the timing sprocket marks may be used if the engine does not show signs of too frequent overhauling.

Carefully turn crankshaft and camshaft that the "zero" on camshaft sprocket and punch marks on crankshaft sprocket face each other and are on same center line thru the camshaft and crankshaft. See Fig. 1.

IMPORTANT: If chain has arrows on links place chain so arrows will point in direction that chain is to run.

Replace chain and bring ends together on one of the sprockets. In the case of a Morse chain proceed as follows:

Each joint of the chain contains two pins, see Fig. 2; the ribbed seat pin (5) and plain rocker pin (3). Insert a new rocker pin (3) and a used or an extra pin to align the links. In replacing the pins be sure that rocker pin is inserted as shown in Fig. 2. Turn engine and bring incomplete linkage between the two sprockets. Insert a new seat pin which has a washer riveted to it from the rear or inside edge of the chain, forcing out the seat pin used for alignment. Place a washer over head and rivet.

VALVE SETTING.

As practically all modern engines use but a single camshaft with both intake and exhaust cams mounted thereon, it is only necessary to set one cam and all the rest should follow; however, cases have been found where this rule does not hold, because of a twisted cam shaft or improperly ground cams, and to make absolutely certain it is recommended that each cylinder be checked individually with a MOTOR GAUGE, especially if an owner has complained of an engine which has no power at medium and high speeds.

The first step is to turn the flywheel until pistons 1 and 4 (4 cyl.); 1 and 6 (6 cyl.); or 1 and 8 (8 cyl.) engines are on top dead center. This position should be checked by watching the pistons rather than by using the flywheel marks. However, it will readily be apparent if the flywheel marks are correct or not. If the flywheel is correctly stamped the mark "1-6 UDC" (which means piston No. 1 and No. 6 on upper dead center) will be directly on top of flywheel or opposite the pointer if on the side.

Turn the flywheel slightly farther and look for mark, "Ex. C" (which means exhaust closes). After first adjusting the valve clearance on either No. 1 or No. 6 exhaust valves and placing a thin piece of paper under valve stem, turn camshaft in same direction as crankshaft runs, until the exhaust valve opens and just closes. This exact position can be determined by keeping a slight tension on the paper. The moment it is released the valve has closed. Replace the chain in this position.

Should the flywheel not be marked the same procedure would be followed, bearing in mind that the exhaust valves on all engines close either on top dead center or from that point up to 10 degrees past T.D.C., the average being about 6 degrees past T.D.C. Six degrees on a 16 inch dia. flywheel is a distance of $\frac{27}{32}$ of an inch. The piston travel in this distance would be negligible. Fig. 3 shows the valve timing diagram of the Chrysler Imperial "80". It will be seen that the exhaust valves close 2 degrees past T. D. C.

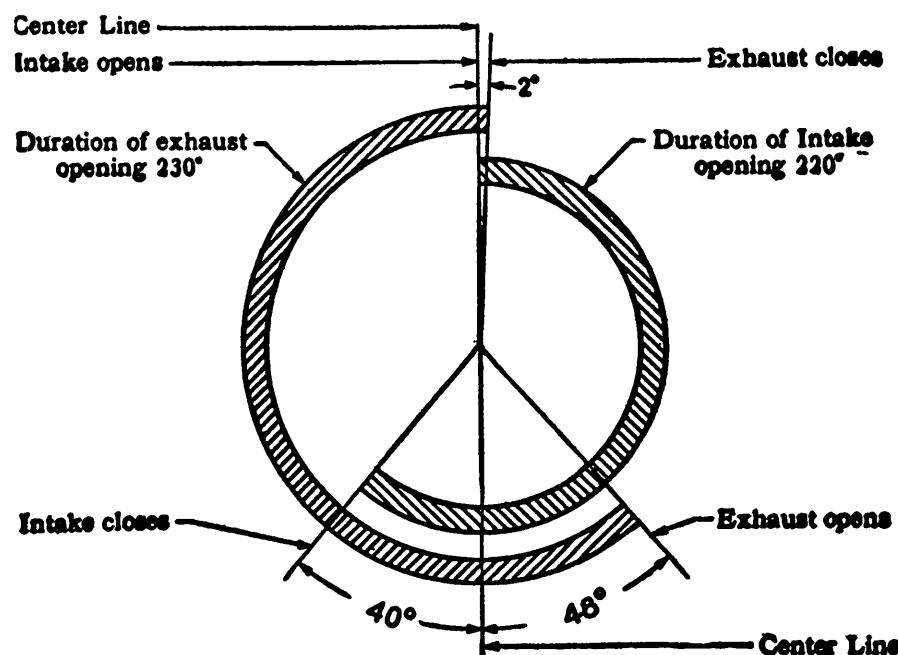


Figure 3

1928 "Thief-Proof" Lock Ignition Switches

"ELECTROLOCK", TYPES "A" AND "B".

SHALER LOCK WITH MAGNETIC GROUNDING LATCH.

CLUM, TYPE 8663.

Theory of Operation and Servicing

"ELECTROLOCK".

"Electrolock" is an ignition switch and lock, so constructed that shutting off ignition automatically locks the car. When in the locked position, the ignition circuit is not only opened but at the same time the distributor is grounded, making it impossible to wire around ignition switch by use of "jump" wires. The wire from ignition switch to distributor is enclosed in a heavy steel armored cable, the cable being permanently fastened to distributor stud, making it impossible to "clear the ground". Once the cable has been fastened to the stud, the stud is forever after a part of the cable. Even the manufacturers have no way of removing this stud. "Electrolocks" are made in two forms, types "A" and "B", both forms being very similar in action. Type "B" is used when Electric Gasoline Gauges, etc., are used, which are only "alive" when ignition is "ON". Type "A" has one terminal on side, while type "B" has three.

OPERATION—TYPE "A".

This type has one terminal only, on side of case.

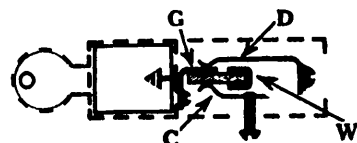


Fig. 1.
Type A "Electrolock" in Locked or "OFF" Position.

"OFF" POSITION.

Fig. 1 shows type "A" in the locked or "OFF" position. Pressing "in" the LOCK CYLINDER forced the WIPER CONTACT "W" back and away from DISTRIBUTOR CONTACT SPRING "D" and COIL CONTACT SPRING "C". CONTACT SPRING "D" now rests on GROUNDING CONTACT "G", grounding the wire to distributor, while CONTACT SPRING "C" now rests on fiber insulation (shown by cross-hatching), thus breaking the ignition circuit.

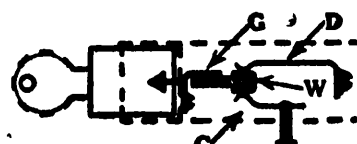


Fig. 2.
Type A "Electrolock" in Unlocked or "ON" Position.

"ON" POSITION.

Fig. 2 shows the switch in the unlocked or "ON" position. By turning key one-quarter turn clockwise the LOCK CYLINDER is released and forced outwards about $\frac{3}{8}$ inch by OPERATING SPRING (not shown). The movement draws GROUNDING CONTACT "G" away and from under DISTRIBUTOR CONTACT "D" (clearing distributor ground). At the same time WIPER CONTACT "W" connects contact springs "C" and "D", completing the ignition circuit. The key is not required to lock the car, and should be removed after operation of unlocking is completed. To lock, press cylinder completely in. BE SURE THAT IT STAYS IN to avoid possibility of discharging battery thru distributor points, as is the case with an ordinary ignition switch.

SPECIAL TYPE "A" FORD "ELECTROLOCK".

Fig. 3 shows switch used on Model "A" Ford. The theory of operation is same as explained above; difference being in the shape of parts only. Unlike the standard "Electrolock" assembly, however, the distributor housing may be removed from cable and switch, by removing cylinder head nut which holds cable; releasing distributor base locking set screw, and lifting assembly clear of cylinder head, after which the distributor may be unscrewed from cable.

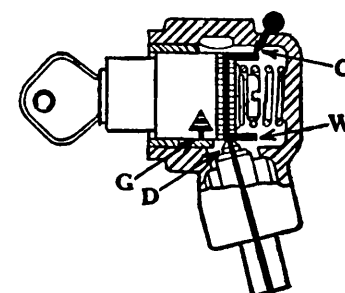


Fig. 3.
Special Type 6A Ford "Electrolock" in Unlocked or "ON" Position.

"TROUBLE SHOOTING", TYPE "A" ELECTROLOCK

Should ignition trouble develop, to ascertain if it exists in the "Electrolock" the following tests should be made, by using six volt battery with a 21 C. P. test light in series with TEST POINTS.

1. Remove wire from terminal on side of switch. Tape end of wire, as it is "alive" at all times.
2. Remove distributor cap and open breaker points, either by hand cranking engine until arm is opened by cam, or by inserting paper between contact points. (In case of high speed double breakers it is recommended that paper be used).



Fig. 4.
Type A "Electrolock", Cable, and Distributor Assembly.

3. Place one TEST POINT on primary terminal on inside of distributor ("A", Fig. 4), and the other TEST POINT on LOCK TERMINAL "B". With switch unlocked ("ON" position), lamp should burn. With switch locked ("OFF" position), the lamp should **not** burn.

4. Place one TEST POINT on primary terminal on inside of distributor ("A", Fig. 4), and other on any part of LOCK CASING ("E", Fig. 4). With switch locked ("OFF" position), the lamp should burn. With switch unlocked ("ON" position), the lamp should **not** burn. Should the lamp burn in the unlocked or "ON" position of switch, there is either a ground in the "Electrolock", or distributor condenser is shorted or grounded. It will be necessary to disconnect condenser from distributor to determine whether ground is in "Electrolock" or condenser.

5. If above tests are "O. K." ignition trouble is elsewhere in ignition circuit.

6. Should above tests indicate trouble in "Electrolock" switch, it should then be unlocked and removed from the mounting. The LOCK CYLINDER can then be removed by taking out the small set screw on the side of LOCK CASING. Remove coil spring, which is directly behind LOCK CYLINDER, and pull out metal wedge which holds the bakelite terminal block in position. With terminal screw removed, that part of the bakelite piece in which the terminal screw is located, can be pushed into the LOCK CASING, and LOCK CASING can then be slid back on cable, allowing switch to be inspected. Any trouble with switch, due to broken parts, will then be readily discovered.

7. In order to make distributor repairs which cannot be accomplished on the car, the switch can be unlocked, removed from mounting, and distributor taken to the bench with lock and cable attached.

8. Should lock plunger not work freely on account of dirt or foreign matter getting into lock case, the cylinder should be removed and cleaned off, that it will work freely.

9. Never put grease or oil in lock cylinder; if tumblers seem to stick use graphite.

OPERATION—TYPE "B".

This type has three terminals on side of case.

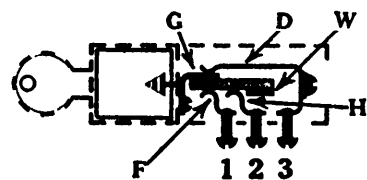


Fig. 5.
Type B "Electrolock" in Locked or "OFF" Position.

"OFF" POSITION.

Fig. 5 shows type "B" in the locked or "OFF" position. Pressing "in" the LOCK CYLINDER forced the WIPER CONTACT "W" back and away from BATTERY FEED CONTACT SPRING "F" and COIL and GASOLINE GAUGE CONTACT SPRING "H". CONTACT SPRINGS "F" and "H" now rest on fiber insulation (shown by cross-hatching), thus breaking the ignition and gasoline gauge circuits; while CONTACT SPRING "D" now rests on GROUNDING CONTACT "G", grounding the wire to distributor.

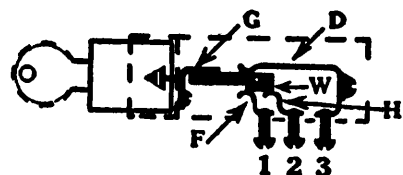


Fig. 6.
Type B "Electrolock" in Unlocked or "ON" Position.

"ON" POSITION.

Fig. 6 shows the switch in the unlocked or "ON" position. By turning key one-quarter turn clockwise the LOCK CYLINDER is released and forced outwards about $\frac{3}{8}$ inch by operating spring (not shown). This movement draws GROUNDING CONTACT "G" away and from under DISTRIBUTOR CONTACT SPRING "D" (clearing distributor and coil ground). At the same time WIPER CONTACT "W" connects CONTACT SPRINGS "F" and "H", completing the ignition circuit.

"TROUBLE SHOOTING", TYPE "B" ELECTROLOCK.

Should ignition trouble develop, to ascertain if it exists in the "Electrolock" the following tests should be made, by using a six volt battery with a 21 C. P. test light in series with TEST POINTS.

1. Remove all wires from terminals on side of switch. Tape end of wire taken from No. 1 Terminal (Fig. 7), as it is "alive" at all times.

2. Remove distributor cap and open breaker points, either by hand cranking engine until arm is opened by cam, or by inserting paper between contact points. (In case of high speed double breakers it is recommended that paper be used.)

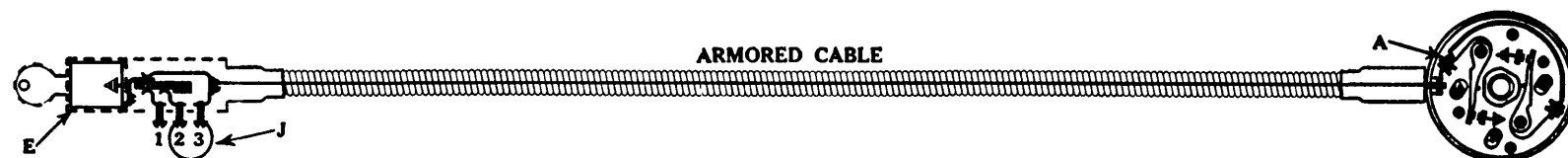


Fig. 7.
Type B "Electrolock", Cable, and Distributor Assembly—Terminals No. 1—Feed from Ammeter; No. 2—Gasoline Gauge and Ignition Coil; No. 3—Ignition Coil.

3. With a short wire connect terminals No. 2 and No. 3 together, ("J", Fig. 7). Place one TEST POINT on primary terminal on inside of distributor ("A", Fig. 7), and the other TEST POINT on LOCK TERMINAL No. 1. With switch unlocked ("ON" position), lamp should burn. With switch locked ("OFF" position), the lamp should **not** burn.

4. Remove temporary "jump" wire, connecting terminals No. 2 and No. 3. Place one TEST POINT on primary terminal on inside of distributor ("A", Fig. 7), and the other TEST POINT on LOCK TERMINAL No. 2. Unlock switch, push LOCK BARREL in about half way, and release. The lamp should not burn or flash in thus operating the LOCK BARREL.

5. Place one TEST POINT on terminal No. 3, and other TEST POINT on any part of LOCK CASING ("E", Fig. 7). With switch locked ("OFF" position), the lamp should burn. With switch unlocked ("ON" position), the lamp should **not** burn. Should the lamp burn in the unlocked or "ON" position of switch there is either a ground in the "Electrolock", or distributor condenser is shorted or grounded. It will be necessary to disconnect condenser from distributor to determine whether ground is in "Electrolock" or condenser.

6. If above tests are "O. K." ignition trouble is elsewhere in ignition circuit.

7. Should above tests indicate trouble in "Electrolock" switch, it should then be unlocked and removed from the mounting.

WARNING: Disconnect ammeter wire from terminal No. 1 before attempting to remove LOCK CYLINDER. Failure to do this will result in burning out wire in armored cable from switch to distributor; burning insulation in distributor housing, as well as drawing the temper of CONTACT ARM springs. For details of removing LOCK and servicing see paragraphs 6, 7, 8, and 9, under "Trouble Shooting", type A "Electrolock".

SHALER LOCK WITH MAGNETIC GROUNDING LATCH.

The Shaler Lock is an ignition switch and lock, so constructed that shutting off ignition automatically locks the car. When in the locked position the ignition circuit is not only opened, but at the same time the distributor and ignition coil is grounded, making it impossible to wire around ignition switch by use of "jump" wires. The switch itself is very similar in action to the type B "Electrolock"; however, instead of having three terminals on switch barrel, the circuits are brought out by three wires soldered and sealed inside of switch shell, and connecting to ammeter, coil, and coil, respectively. This unit also differs from the "Electrolock" in that the wires from switch to distributor (there being six) are incased in a woven fabric cover instead of the heavy armored cable used by "Electrolock", and the connection to ground is made at the distributor end, instead of in the switch itself.

While the "Electrolock" and Clum Switches depend upon the mechanical impossibility for a car thief to cut the armored cable and tap onto the single distributor wire, thus clearing the distributor ground and "jumping out" ignition lock, the Shaler Lock employs a magnetic grounding latch which will permanently ground the distributor head if current is inadvertently supplied to the magnetic latch windings. Live wires are twisted beside the two "dead ended" wires running from switch to grounding latch. The operation of cutting directly across wire assembly (anywhere between switch and distributor), will feed six volt current to the latch winding. The grounding latch is securely locked to distributor head and incased in metal, making it impossible to readily "clear the ground". When this condition exists it is necessary to replace entire Shaler assembly, including switch, cable, and latch; repairs not being recommended.

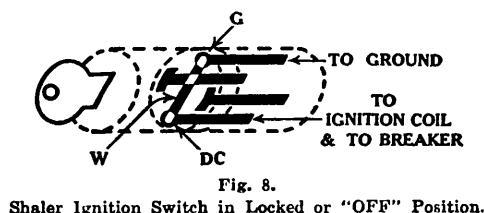


Fig. 8.
Shaler Ignition Switch in Locked or "OFF" Position.

OPERATION OF SHALER SWITCH.

"OFF" POSITION.

Fig. 8 shows switch in locked or "OFF" position. Turning the LOCK CYLINDER moved WIPER CONTACT "W", tying switch contacts "G" (connected to ground) and "DC" (connected to coil and insulated breaker point, respectively), together, thus grounding distributor, at the same time breaking ignition circuit.

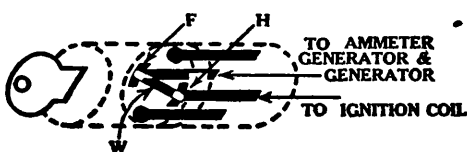


Fig. 9.
Shaler Ignition Switch in Unlocked or "ON" Position.

"ON" POSITION.

Fig. 9 shows switch in unlocked or "ON" position. Turning the LOCK CYLINDER moved WIPER CONTACT "W", tying switch contacts "F" (connected to ammeter, generator, and generator, respectively—Chrysler 52; on other cars, contact "F" connected to ammeter and two wires "dead ended" in latch housing), and "H" (connected to ignition coil), together, thus clearing distributor ground, at the same time completing the ignition circuit.

OPERATION OF MAGNETIC GROUNDING LATCH.

Wires "K" and "M" (Fig. 10) are "dead ended" in ignition switch. The other ends of these wires are connected to the MAGNETIC GROUNDING LATCH winding, and are only "alive" when cable between switch and distributor is CUT by knife or pliers, thus feeding current from "hot" wires "N" and "O" to MAGNETIC LATCH WINDING "Y", causing armature bar "X" to be pulled down and locked under LOCKING LATCH "S", permanently grounding the insulated breaker arm.

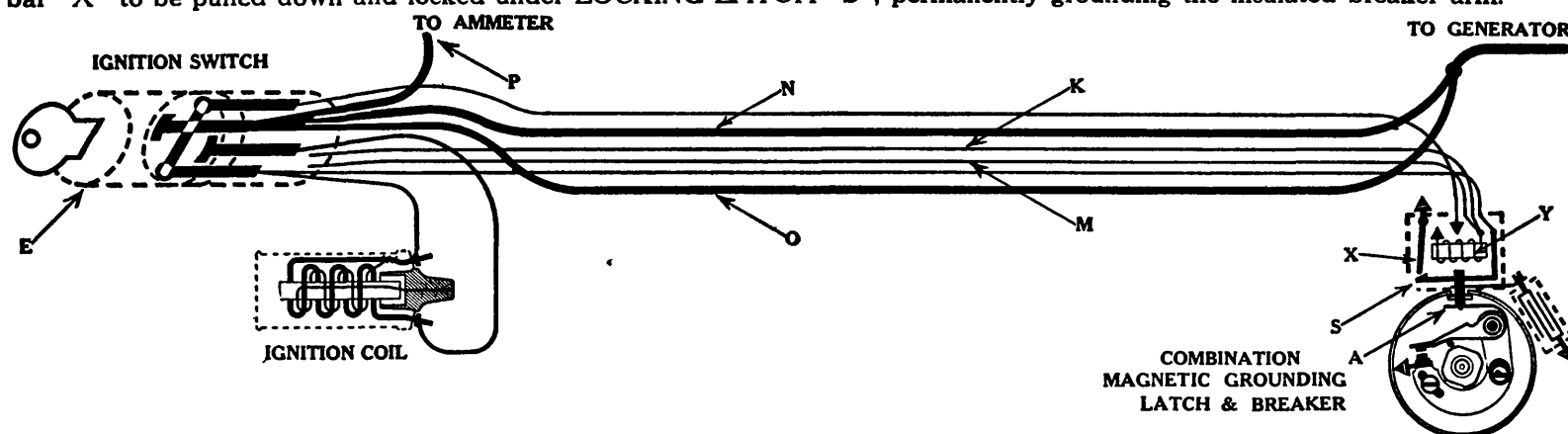


Fig. 10.
Shaler Switch—Wire Assembly and Magnetic Grounding Latch, as used on 1928 Chrysler 52.

"TROUBLE SHOOTING" ON SHALER LOCK SWITCH.

Should ignition trouble develop, to ascertain if it exists in the Shaler assembly, the following tests should be made by using six volt battery with a 21 C. P. test light in series with TEST POINTS.

1. Remove all wires leading from switch assembly, (which are connected to ammeter, coil and coil, and to gasoline gauge when used).

2. Remove distributor cap and open breaker points, either by hand cranking engine until arm is opened by cam, or by inserting paper between contact points.

3. Place one TEST POINT on primary terminal on inside of distributor ("A", Fig. 10), and touch other TEST POINT to wire ("P", Fig. 10), taken from the ammeter. With switch unlocked ("ON" position), lamp should burn. With switch locked ("OFF" position), the lamp should not burn.

IMPORTANT: Should lamp not burn in the "ON" position, grasp the MAGNETIC GROUNDING LATCH BOX, attached to side of distributor, and twist it slightly back and forth. If lamp flickers it is an indication that spring connection between box and distributor stud is corroded. This can only be rectified by replacing entire unit. **This condition causes hard starting engines.**

4. Place one point on primary terminal on inside of distributor ("A", Fig. 10), and other on any part of distributor housing ("E", Fig. 10). With switch locked ("OFF" position), the lamp should burn. With switch unlocked ("ON" position), the lamp should not burn. Should lamp burn in the "ON" position the MAGNETIC GROUNDING LATCH has either been tripped, or distributor condenser is shorted or grounded. It will be necessary to disconnect condenser from distributor to determine whether ground is in latch or condenser.

5. Turn switch to "ON" position, touch one TEST POINT to wire ("P", Fig. 10), taken from ammeter, touch TEST POINT successively to each of other two wires disconnected from ignition coil. If switch is "O. K." one of the wires will cause lamp to burn.

6. If above tests are "O. K." ignition trouble is elsewhere in ignition circuit.

CLUM DISTRIBUTOR LOCK IGNITION SWITCH.

This unit is an ignition switch and lock, so constructed that shutting off ignition automatically locks the car. When in the locked position, the ignition circuit is not only opened but at the same time the distributor is grounded, making it impossible to wire around ignition switch by use of "jump" wires. The wire from ignition switch to distributor is enclosed in a heavy double steel armored cable, the cable being permanently fastened to distributor stud, making it impossible to "clear the ground". Once the cable has been fastened to the stud, the stud is forever after a part of the cable. Even the manufacturers have no way of removing this stud.

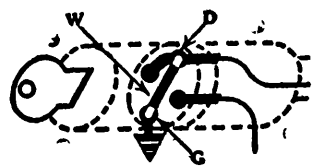


Fig. 11.
Clum Type 8663 Ignition Switch in Locked or "OFF" Position.

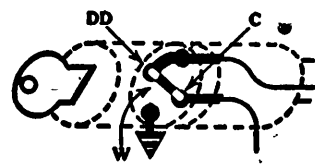


Fig. 12.
Clum Type 8663 Ignition Switch in Unlocked or "ON" Position.

OPERATION.

"OFF" POSITION.

Fig. 11 shows this switch in the locked or "OFF" position. Turning the LOCK CYLINDER moved WIPER CONTACT "W", tying switch contacts "D" (connected to distributor) and "G" (connected to ground), together, thus grounding distributor, at the same time breaking ignition circuit.

"ON" POSITION.

Fig. 12 shows switch in unlocked or "ON" position. Turning the LOCK CYLINDER moved WIPER CONTACT "W", tying switch contacts "DD" (connected to distributor) and "C" (connected to coil), together, thus clearing distributor ground, at the same time completing the ignition circuit.

"TROUBLE SHOOTING" ON CLUM LOCK SWITCH.

Should ignition trouble develop, to ascertain if it exists in the Clum assembly, the following tests should be made, by using six volt battery with a 21 C. P. test light in series with TEST POINTS.

1. Remove the wire from ignition coil, which runs from side of LOCK CASING.
2. Remove distributor cap and open breaker points, either by hand cranking engine until arm is opened by cam, or by inserting paper between contact points.
3. Place one TEST POINT on primary terminal on inside of distributor ("A", Fig. 13), and touch other TEST POINT to end of wire running from side of lock ("O", Fig. 13). With switch unlocked ("ON" position), lamp should burn. With switch locked ("OFF" position), lamp should not burn.

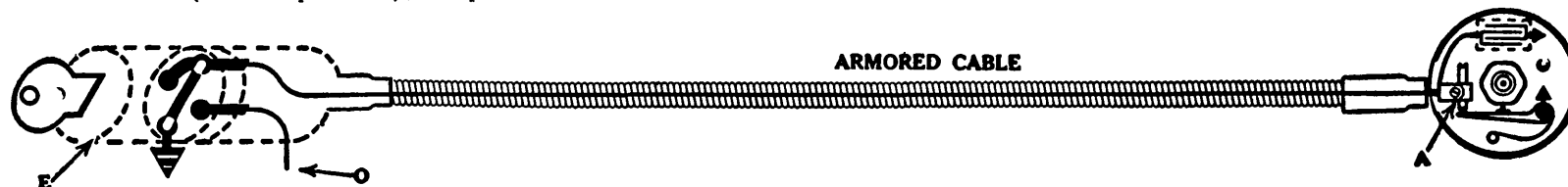


Fig. 13.
Clum Type 8663 Ignition Switch, Cable, and Distributor Assembly.

4. Place one TEST POINT on primary terminal on inside of distributor ("A", Fig. 13), and other on any part of lock casing ("E", Fig. 13). With switch locked ("OFF" position), the lamp should burn. With switch unlocked ("ON" position), the lamp should not burn. Should the lamp burn in the unlocked or "ON" position of switch, there is either a ground in the "Clum Assembly" or distributor condenser is shorted or grounded. It will be necessary to disconnect condenser from distributor to determine whether ground is in "Clum Assembly" or condenser.

5. If above tests are "O. K." ignition trouble is elsewhere in ignition circuit.

1929 "Thief-Proof" Lock Ignition Switches

"ELECTROLOCK", TYPES "9-A" AND "9-B"

SHALER LOCK WITH "FUSIBLE GROUNDING LINK".

1929 "Electrolocks"

The types "9-A" and "9-B" Electrolocks, developed for 1929 automobiles, are very similar in action to the types "A" and "B" used in 1928, and described on pages 17 and 18 of this section. The method of switching is somewhat different, however, the action now being a turning movement instead of the in and out motion used in 1928. Rights to manufacture have been purchased by the Delco-Remy Corp., and on many of the 1929 productions a Delco-Remy parts number is listed.

THEORY OF OPERATION

The "Electrolock" is an ignition switch and lock, so constructed that shutting off ignition automatically locks the car. When in the locked position, the ignition circuit not only is "opened" but at the same time the insulated breaker point is grounded, making it impossible to wire around the ignition switch by use of "jump" wires. The wire from ignition switch to distributor is enclosed in a heavy steel armored cable, the cable being attached to the distributor in such a way that it is very difficult to remove. (For detailed instructions on how to remove cable from 1929 Chevrolet Distributor, see P. 27 of this section.) "Electrolocks" are made in four forms, types "A" and "9-A"; "B" and "9-B", all forms being very similar in action. Types "B" and "9-B" are used when car is equipped with gasoline gauges, etc., which should only be "alive" when ignition is "ON". Types "A" and "9-A" have but one terminal, while types "B" and "9-B" have three.

OPERATION — TYPE "9-A"

This Type has but one Terminal on Side of Case

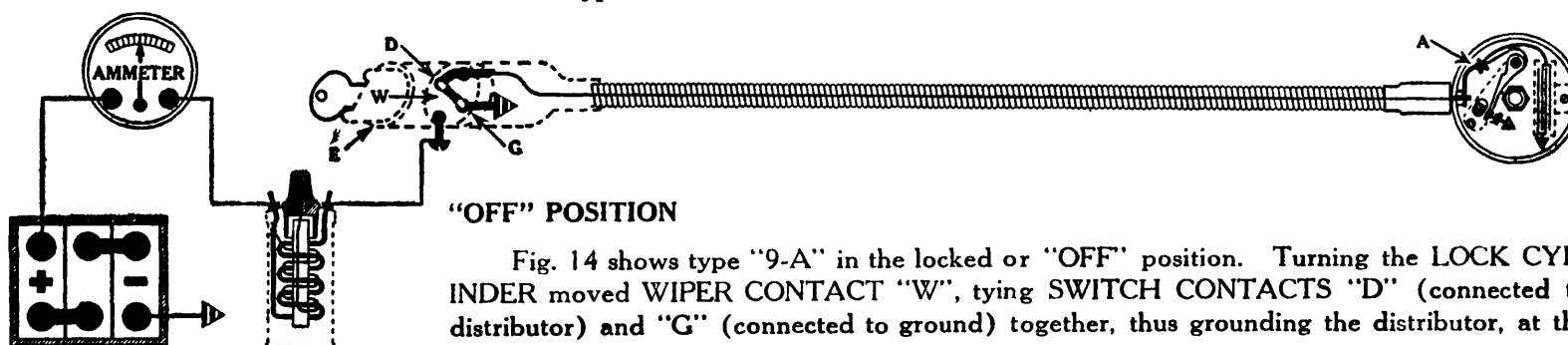


FIG. 14.
Type 9-A "Electrolock" in Locked or "OFF" Position.

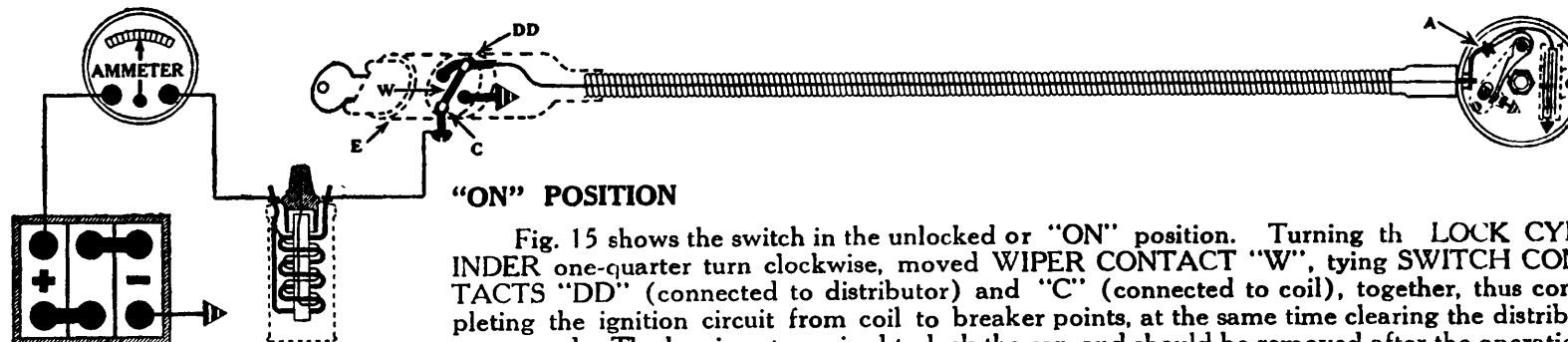


FIG. 15.
Type 9-A "Electrolock" in Unlocked or "ON" Position.

Fig. 14 shows type "9-A" in the locked or "OFF" position. Turning the LOCK CYLINDER moved WIPER CONTACT "W", tying SWITCH CONTACTS "D" (connected to distributor) and "G" (connected to ground) together, thus grounding the distributor, at the same time breaking the ignition circuit.

Fig. 15 shows the switch in the unlocked or "ON" position. Turning the LOCK CYLINDER one-quarter turn clockwise, moved WIPER CONTACT "W", tying SWITCH CONTACTS "DD" (connected to distributor) and "C" (connected to coil), together, thus completing the ignition circuit from coil to breaker points, at the same time clearing the distributor ground. The key is not required to lock the car, and should be removed after the operation of unlocking is completed.

TROUBLE SHOOTING ON TYPE "9-A" ELECTROLOCK

Should ignition trouble develop, to ascertain if it exists in the "Electrolock" the following tests should be made, by using six volt battery with a 21 C.P. test light in series with TEST POINTS. In making tests the breaker points should be open.

1. Remove wire from terminal on side of switch. Tape end of wire, as it is "alive" at all times.
 2. Remove distributor cap and open breaker points, either by hand cranking engine until arm is opened by cam, or by inserting paper between contact points. (In case of high speed double breakers it is recommended that paper be used.)
 3. Place one TEST POINT on the primary terminal inside the distributor ("A", Fig. 14), and the other TEST POINT on the LOCK TERMINAL. With the switch unlocked, the lamp should burn. With the switch locked, the lamp should not burn.
 4. Place one TEST POINT on the primary terminal inside the distributor ("A", Fig. 14) and the other TEST POINT on the LOCK CASING ("E", Fig. 14). With the switch locked, the lamp should burn. With the switch unlocked the lamp should not burn. If the lamp burns either there is a ground in the "Electrolock" or the distributor condenser is shorted or grounded. It will be necessary to disconnect condenser from distributor to determine whether the trouble is in the "Electrolock" or condenser.
- If the above tests show up satisfactorily, and there is still ignition trouble evident, this ignition trouble must be located elsewhere in the ignition circuit.

Should the above test indicate some trouble in the "Electrolock" switch, the lock should then be removed from the mounting. The LOCK CYLINDER can be removed by turning to the unlocked position and removing the small screw in the side of the LOCK CASING near the end. After the LOCK CYLINDER is removed, any trouble due to broken parts will then be readily discovered. The necessary parts for repairs can be obtained through the car dealer or service stations.

In order to make distributor repairs which cannot be accomplished on the car, the lock can be unlocked, removed from the mounting, and the distributor taken to the bench with the lock and cable attached.

Should the LOCK CYLINDER not work freely on account of dirt or foreign matter getting into the lock case, the cylinder should be removed and cleaned off so that it will work freely.

Never put grease or oil in LOCK CYLINDER; if tumblers seem to stick, use graphite.
Replacement keys may be obtained from the service stations.

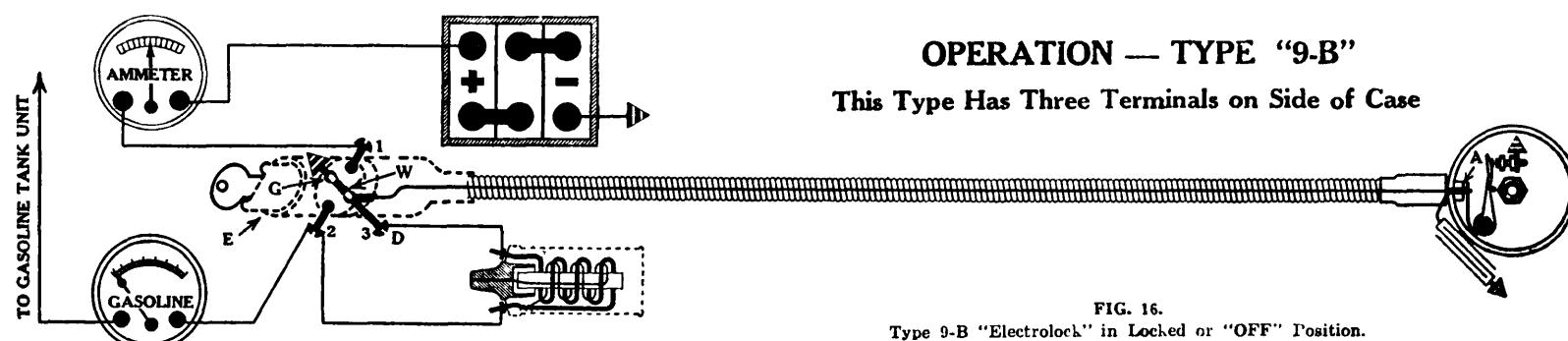
All wir terminals should be insulated down to screw head, so as to eliminate possibility of shorting by touching one another or nearby metal parts.

The new "Electrolocks" are provided with a serviceable timer end which permits the removal of the SNAP TERMINAL ASSEMBLY from the "Electrolock" without destroying the "Electrolock".

In order to remove the SNAP TERMINAL ASSEMBLY from "Electrolock", first remove the SNAP TERMINAL ASSEMBLY from the distributor, cut the terminal post to remove GROUNDING CUP and INSULATING WASHER, then unscrew the TIMER END NUT, which is staked in. This will permit the removal of the SNAP TERMINAL ASSEMBLY with the TIMER END LOCK RING attached.

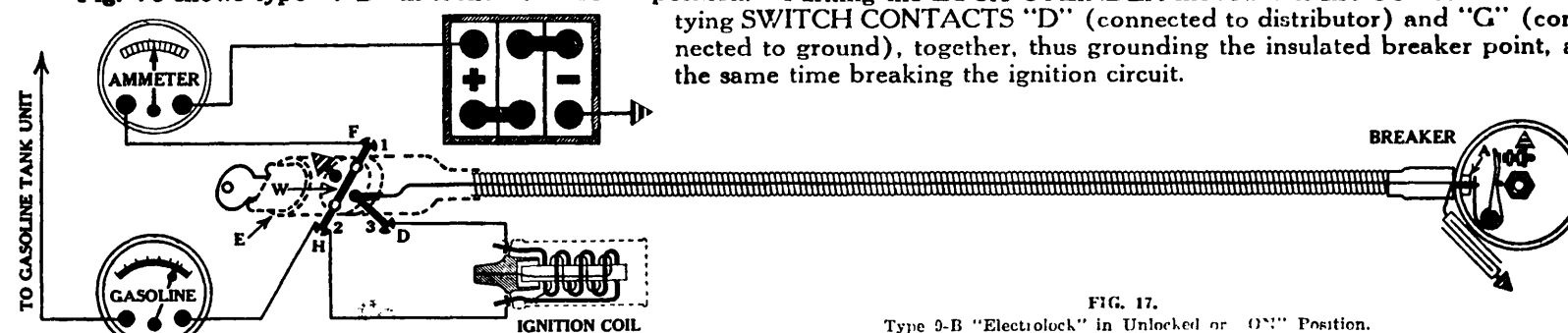
The TIMER END CONTACT SPRING ASSEMBLY, which is fastened to the current-carrying wire, is also serviceable. A tool with a hooked end may be used to remove this assembly.

When replacing the TIMER END CONTACT SPRING ASSEMBLY, insert in timer end and push in as far as possible, then insert the TIMER END LOCK RING, the TIMER END INSULATING WASHER, and then fasten these in with the TIMER END NUT. Be sure to stake in the TIMER END NUT so that it will not loosen in use.



"OFF" POSITION

Fig. 16 shows type "9-B" in locked or "OFF" position. Turning the LOCK CYLINDER moved WIPER CONTACT "W", tying SWITCH CONTACTS "D" (connected to distributor) and "G" (connected to ground), together, thus grounding the insulated breaker point, at the same time breaking the ignition circuit.



"ON" POSITION

Fig. 17 shows the switch in the unlocked or "ON" position. Turning the LOCK CYLINDER one-quarter turn clockwise, moved WIPER CONTACT "W", tying SWITCH CONTACT "F" (connected to ammeter) to SWITCH CONTACT "H" (connected to both gasoline gauge and ignition coil), together, thus completing the ignition circuit thru the ignition coil, then back to SWITCH CONTACT "D" which, in turn, is connected to the insulated breaker point. The operation, of course, cleared the distributor ground, and at the same time completed the gasoline gauge circuit.

TROUBLE SHOOTING ON TYPE "9-B" ELECTROLOCK

Should ignition trouble develop, to ascertain if it exists in the "Electrolock", the following tests should be made, by using a six volt battery with a 21 C.P. test light in series with TEST POINTS. In making tests the breaker points should be open.

1. Remove all wires from terminals on LOCK CASE. Tape end of wire taken from terminal (#1, Fig. 17), as it is "alive" at all times.
2. Remove distributor cap and open breaker points, either by hand cranking engine until arm is opened by cam, or by inserting paper between contact points. (In case of high speed double breakers it is recommended that paper be used.)

3. Place one TEST POINT on the primary terminal inside the distributor ("A", Fig. 17), and the other TEST POINT on the LOCK HOUSING ("E", Fig. 17) or wire conduit. With the switch locked the lamp should burn. With the switch unlocked the lamp should **not** burn.

4. Place one TEST POINT on the terminal marked "Coil" (Terminal #3, Fig. 17), and the other TEST POINT on the LOCK CASING ("E", Fig. 17). With the switch locked, the lamp should burn. With the switch unlocked the lamp should **not** burn. If the lamp burns, either there is a ground in the "Electrolock" or the distributor condenser is shorted or grounded. It will be necessary to disconnect condenser from distributor to determine whether the trouble is in the "Electrolock" or condenser.

If the above tests show up satisfactorily, and there is still ignition trouble evident, this ignition trouble must be located elsewhere in the ignition circuit.

Should the above test indicate some trouble in the "Electrolock" switch, the lock should then be removed. Follow same instructions as for "Electrolock", type "9-A".

1929 SHALER IGNITION SWITCHES

The 1929 Shaler Lock Ignition Switch Assembly with box type "Thief Trap" has the same general outside appearance as the 1928 job. The switch action is exactly the same, and described on page 19 of this section, while the same "Trouble Shooting" instructions should be followed in case of ignition failures.

1929 SHALER "THIEF TRAP" (BOX TYPE)

The Magnetic Grounding Latch, as used in 1928, has been discontinued, and in its place is found a "Grounding Spring" ("X", Fig. 18), which is held under compression by a small loop of impregnated silk. The tension of the GROUNDING SPRING pulls the silk loop firmly against a short strip of wire. This wire is of a material which will become red hot if current is passed thru it. One end of the heat wire is connected to ground, while the other end is attached to wires "K" and "M" (Fig. 18), which run in the woven cable from ignition switch to breaker, and which wires are "dead ended" (ignition switch end). Should a car thief cut the woven cable with knife

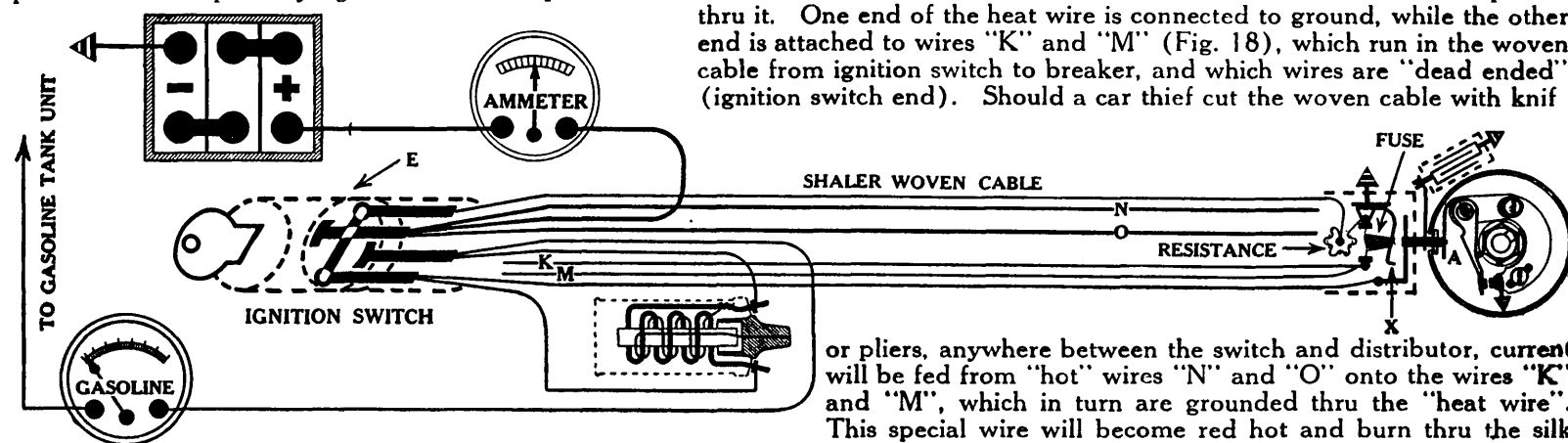


FIG. 18.

1929 Shaler Lock Switch—Wire Assembly, Fusible Grounding Link, and Distributor.

or pliers, anywhere between the switch and distributor, current will be fed from "hot" wires "N" and "O" onto the wires "K" and "M", which in turn are grounded thru the "heat wire". This special wire will become red hot and burn thru the silk loop, thus releasing the GROUNDING SPRING "X", which snaps against the insulated terminal, permanently grounding the insulated breaker arm.

A small resistance unit is found in the square type "Thief Traps". This unit is in series with the wire which grounds the insulated point when switch is in the "OFF" position. The purpose of this unit is to hold back current which might reach ground thru this wire, when a thief cuts the cable, and thus compel the current to follow thru wires "K" and "M" to the "heating wire".

1929 SHALER "THIEF TRAP" (ROUND TYPE)

The action of the round type Shaler "Thief Trap" is exactly the same as that of the box type, both making use of the "Fusible Link" principle with GROUNDING SPRING. The round type job, however, does not have the little resistance unit in series with the switch grounding wire, and but one "hot wire" is dead ended in the trap. Three wires are run from end of the "heat wire", all three being dead ended in the switch. For wiring diagram of this unit refer to Peerless, Model 61, 1929.

1929 DISTRIBUTORS

AUTO-LITE TWIN IGNITION AND HIGH SPEED BREAKERS

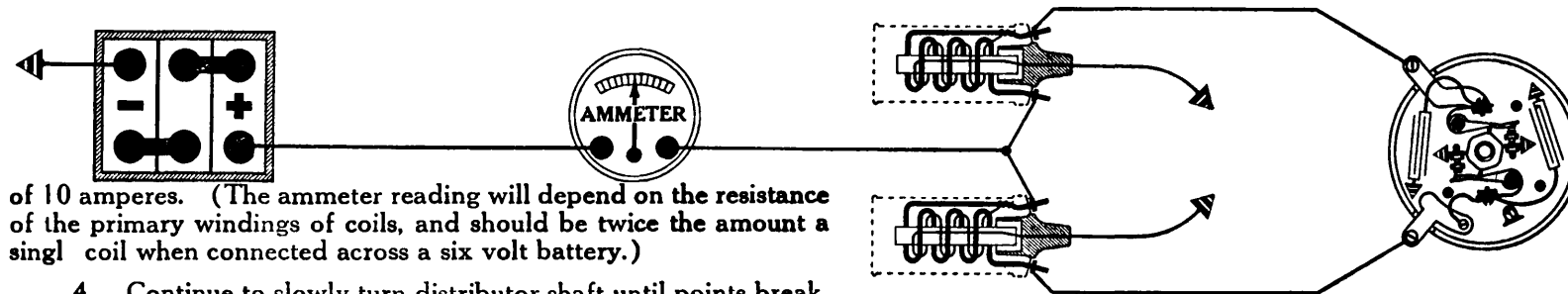
TWIN IGNITION

The new Series IGE Auto-Lite Distributors, which are standard equipment on the 1929 Nash "Advanced" and "Special Six" automobiles, are of the "Dual" type, having a single six lobe cam with two independent sets of breaker points and two condensers, both sets being electrically separate. Two ignition coils, and two sets of spark plugs are used with this unit.

It is very important that both spark plugs in each cylinder fire at exactly the same time, and in order to accomplish this the contact separation for both sets of breaker points must be carefully adjusted to the same width opening, and the movable breaker assembly must be accurately located and locked.

HOW TO SYNCHRONIZE "TWIN IGNITION" DISTRIBUTORS

1. Car fully check the maximum breaker contact separation of each set of points, adjusting the gap .020 to .024 inch on each. Adjust both alike, using a thickness gauge.
2. Connect the distributor as shown in Fig. 1, with an ammeter in series with a battery, and the two coils and breaker points in a parallel. (Ground off the high tension terminal of each coil, and remove the distributor cap from breaker assembly).
3. Slowly turn the distributor shaft until both sets of points are closed, at which time the ammeter should show a discharge



of 10 amperes. (The ammeter reading will depend on the resistance of the primary windings of coils, and should be twice the amount a single coil when connected across a six volt battery.)

4. Continue to slowly turn distributor shaft until points break. If both sets of points are properly synchronized the ammeter will drop to zero in one motion. If points are out of position the ammeter reading will drop to 5 when first set opens and zero when second set opens.

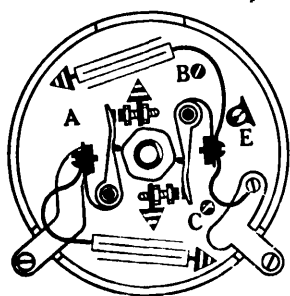


FIG. 2.
Auto-Lite Distributor, Type
IGE-4002.

5. If points are found out of synchronism loosen the three locking screws marked "A", "B" and "C" (Fig. 2), which lock the Sub Plate in position, and move the entire breaker point assembly carried on the breaker plate Sub Plate by turning the eccentric adjusting screw ("E", Fig. 2).

6. It may be necessary to check the synchronism several times to have it perfect. After proper adjustment is made lock with screws "A", "B" and "C".

In synchronizing these distributors in a test bench use the panel ammeter and two coils connected to distributor, as shown in "Fig. 1."

ASSEMBLING AUTO-LITE DISTRIBUTORS IGE-4001 AND IGE-4002 TO ENGINE

In assembling the IGE Series of distributors to the engine it is important that the relation between the drive tongue on lower end of distributor shaft, the advance arm, and the distributor rotor be maintained. Fig. 3 shows this relative position for the IGE-4001 distributor, while Fig. 4 shows the relative position for the IGE-4002 distributor.

1929 AUTO-LITE HIGH SPEED IGNITION DISTRIBUTORS

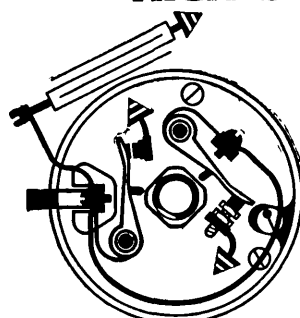


FIG. 5.
Auto-Lite Distributor, Type
IGH-4001-A.

The Auto-Lite "IGH" Series of ignition distributors, now standard equipment on the Hupmobile and Chandler Straight Eight automobiles, use a four lobe cam and two sets of breaker points connected in parallel, with but one coil and one condenser, for eight cylinder ignition. See Fig. 5.

THEORY OF OPERATION

Disadvantage of Old Style Distributors:

This distributor was developed to meet ignition requirements on modern high speed engines which could not be taken care of with the old style distributors, which used an eight lobed cam and but a single set of breaker points. With the old style eight lobe cam and single arm, after the break takes place, the "cam follower" must go up over the cam lobe and down the other side before the points can close and the primary circuit again be completed. This travel, of course, cuts down the time interval the points should be together, causing the ignition to become weaker and weaker as engine speeds increase.

How the New Distributors Overcome This Fault:

The high speed distributors have a four lobe cam with two sets of breaker points connected in parallel, and are so designed that one set of points are open when the other set is just breaking; however, the first set closes approximately 12 degrees after the second set opens. It is this quick closing of the primary circuit which lengthens out the time interval (or number of degrees per revolution) that the points are closed

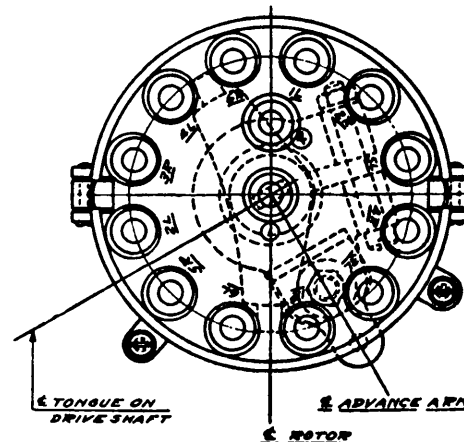


FIG. 3.
Relative positions of Driving Tongue, Advance
Arm, and Rotor for Auto-Lite Dist. IGE-4001.

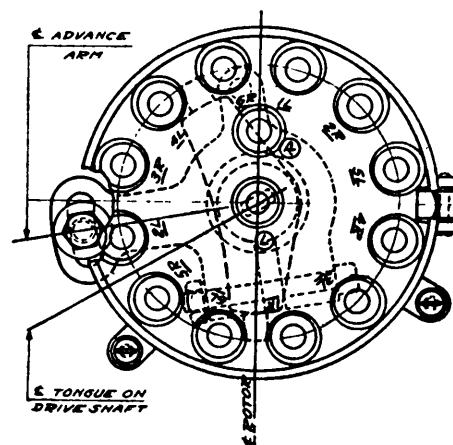


FIG. 4.
Relative positions of Driving Tongue, Advance
Arm, and Rotor for Auto-Lite Dist. IGE-4002.

which makes it possible for the core of ignition coil to become fully magnetized and thoroughly saturated before the next break takes place.

Why These Distributors Must Be Synchronized:

In the case of the old type distributor the interval between breaks was determined by the position of the lobes on the cam. With an eight lobe cam a break was bound to occur every 45 degrees of distributor shaft travel, corresponding to 90 degrees of flywheel travel. With the high speed distributors, however, which make use of two sets of breaker points, each set taking care of four cylinders, the breaker arms must be accurately located that the primary interruptions will occur at exactly the correct intervals, or 45 degrees apart.

To meet this requirement one set of breaker points is mounted on a movable plate, and an eccentric adjusting screw is provided for changing their position.

HOW TO SYNCHRONIZE POINTS

Distributor on Engine:

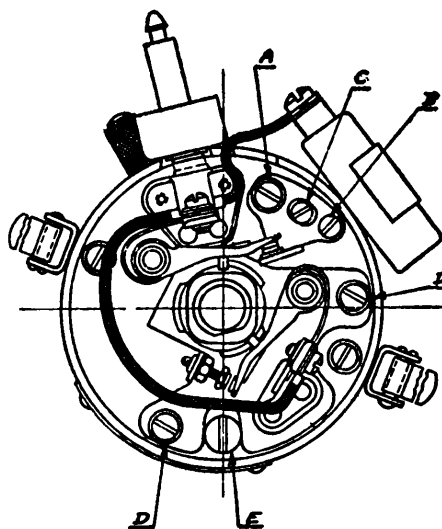


FIG. 6.
Adjusting Screws on Auto-Lite, Type IGH
Distributors.

1. Remove distributor cap and rotor button.
2. Adjust both sets of contact points .020 to .024 inch. (For accuracy use a thickness gauge). The fixed breaker points are adjustable for gap opening by loosening LOCK SCREW "A" (Fig. 6), and PIVOT SCREW "B", and adjusting with ECCENTRIC SCREW "C". After making correct adjustment lock both SCREWS "A" and "B". The movable breaker points are adjustable in the conventional manner by use of point wrenches.
3. Connect a 6 volt test light, one side to either of the insulated arms, and the other side to ground.
4. Turn "on" ignition switch. (With test light connected in this manner the light will burn when points open, and go out when closed).
5. Insulate the movable set of points by inserting a piece of fibre between points.
6. Hand crank engine slowly until fixed breaker points are almost ready to open. (This will be indicated by test bulb lighting when breaker cam back lash is turned in the direction of rotation, and bulb going out when the back lash is turned against rotation.)
7. Replace rotor button on cam. (On top of the fan tail of rotor will be found two synchronizing marks ("A" and "B", Fig. 7) accurately spaced at an angle of 45 degrees.)

8. With the rotor back lash taken up in the direction of drive, place synchronizing gauge (see Fig. 8) on edge of distributor base, so that its point is exactly in alignment with the clockwise line, (for R. H. rotating distributors) or the counter-clockwise line (for L. H. rotating distributors), when test bulb lights. (This is the exact position of break for this set of points. The other set of points should open when engine is slowly cranked, and the trailing degree mark on rotor is exactly opposite the synchronizing gauge point.)

The synchronizing gauge shown in Fig. 8 will be found listed in the tool section of this Service.

9. Before this last test is made the fiber wedge must be removed from between the movable set of points, and placed between the stationary set.

10. If the test light shows the distributor to be out of adjustment loosen the two LOCKING SCREWS "D" (Fig. 6), and adjust by moving sub plate with ECCENTRIC SCREW "E" until proper setting is obtained. Lock SCREWS "D" after completing adjustment.

NOTE: The use of an eccentric adjusting screw has been discontinued and on late model units it is necessary to move the plate by prying it around with the point of a screw driver.

11. Repeat above operations several times to assure an accurate adjustment. It is to be remembered that the distributor shaft turns one-half flywheel speed, and that a discrepancy of but 1 degree on the cam will be twice as much on the flywheel. For smooth engine performance accurately synchronize the points.

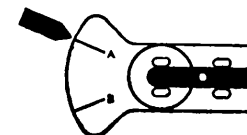


FIG. 7.
Auto-Lite "Special Master
Timing Rotor" #IG-1576.



FIG. 8.
Auto-Lite Distributor
Synchronizing Gauge
#IGH-1.

TO SYNCHRONIZE POINTS IN TEST BENCH

The ideal place to synchronize all high speed distributors is in a test bench which has a rotary spark gap, laid off in degrees. Synchronizing by use of a test bench, not only is much easier, but very much more accurate, and at the same time the number of degrees the primary circuit remains interrupted can also be checked. This is a factor overlooked when synchronizing tools are employed, and an item our engineers have found to be very important if the best results are to be obtained at high speeds. This interval is varied by slightly changing the breaker contact separation.

Test Bench Method:—(Test Bench Drive Motor is not used).

1. Place distributor in vise.
2. Connect either the panel voltmeter or the six volt test light in series with breaker points.
3. Turn distributor base in vise until stationary set of points open when point is at zero on rotary gap. (In clamping distributor shaft and base make sure all back lash is eliminated.)
4. Slowly turn shaft (by hand), watching the voltmeter or light to see when primary circuit is again completed. (Note number of degrees, which should be approximately 12°.)
5. Continue to turn shaft until second set of breaker points open. This should occur at exactly 45 degrees after the first break.

6. If distributor is found to be out of adjustment correct by turning eccentric screw as described under "Synchronizing with Distributor on Car."

SYNCHRONIZING AUTO-LITE DISTRIBUTORS BY USE OF DELCO-REMY 8 CYL. SYNCHRONIZING TOOL No. 820738

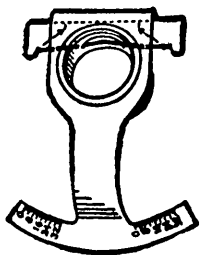


FIG. 9.
Delco-Remy
Synchronizing
Tool #820738.



FIG. 10.
"Standard" Adapter
to use with Delco-
Remy Synchronizing
Tool #820738 on
Auto-Lite Distribu-
tors.

For the convenience of service stations already equipped with Delco-Remy synchronizing tool #820738 (see Fig. 9), we have designed a special adapter, priced at 75c (see Fig. 10), making it possible to use the Delco-Remy synchronizing tool on Auto-Lite distributors, the same procedure being followed as with regular Delco-Remy heads. The adapter will be found listed in the tool section of this Service.

1929 DELCO-REMY 668 SERIES HIGH SPEED IGNITION DISTRIBUTORS

The Delco-Remy 668 Series of ignition distributors, now standard equipment on Graham-Paige, Kissel, Studebaker, Peerless and Pierce-Arrow Straight Eight automobiles, (see Fig. 11), use a four lobe cam and two independent primary circuits. This necessitates two ignition coils, as well as two sets of breaker points (electrically separate), and two condensers. One half of the cylinders are fired from each set of breaker points, and to insure good ignition and smooth engine performance, it is essential that the relationship between the breaker arms be accurately maintained.

One set of breaker points is stationary, while the other set is mounted on a plate, the position of which may be changed by means of an eccentric adjusting screw. The stationary set is adjusted (for contact separation) first, and the synchronizing is completed by adjustments to the movable set of points.

A special synchronizing tool, Delco-Remy #1835009 (see Fig. 12), has been developed to aid in this adjustment. (The new synchronizing tool will be found listed in the tool section of this Service.)

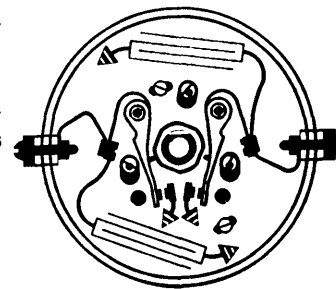


FIG. 11.
Delco-Remy Distributor 668-D.

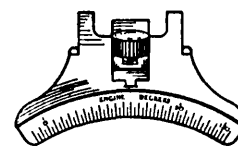


FIG. 12.
Delco-Remy 8 Cyl. Synchroniz-
ing Tool #1835009 for Series 668
Distributors.

Distributor on Engine:

1. Adjust breaker contact separation of STATIONARY ARM "A" (Fig. 13), by slowly hand cranking engine until rubbing block of BREAKER ARM "A" is on lobe of cam. Loosen LOCK SCREW "B" and turn ECCENTRIC SCREW "C" until contact point opening is .022 inch.

2. Tighten LOCK SCREW "B" and recheck point opening.

3. Again slowly hand crank engine until rubbing block of MOVABLE ARM "D" is on lobe of cam. Loosen LOCK SCREW "E", and turn ECCEN-

8. Clamp synchronizing tool #1835009 (Fig. 12), to edge of distributor housing, so that one edge of terminal on the rotor aligns with 0° mark on tool.

9. Again slowly hand crank engine, until the same edge of rotor terminal aligns with 90° mark on tool (the marks on tool are flywheel degrees). At this mark the second set of points should just open. If such is not the case proceed as follows.

10. Loosen LOCKING SCREWS "G" and "H", and move breaker assembly by turning ECCENTRIC ADJUSTING SCREW "I" until points just open. Crank engine over several times to make sure synchronizing is accurate.

11. If found to be correct lock by tightening LOCKING SCREWS "G" and "H".

Should distributor be of L. H. rotation proceed as above, excepting that the edge of rotor will first align with the 90° mark, and then with the 0° mark.

HOW TO SYNCHRONIZE POINTS

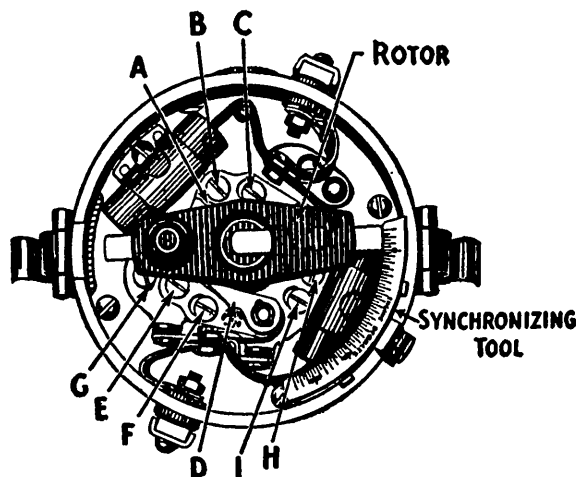


FIG. 13.
Adjusting Screws on Delco-Remy Series 668 Distributors.

TRIC SCREW "F" until contact point opening is .022 inch.

4. Tighten LOCK SCREW "E" and recheck point opening.

5. Slip distributor cap into its correct position on distributor base, and make a mark on base below #1 Terminal. Remove distributor cap, and place rotor in position.

6. Slowly hand crank engine until rotor is opposite mark made on base, and contacts on STATIONARY ARM "A" are just ready to open.

7. Connect ammeters, or 6 volt test lights, in the two primary circuits.

TO SYNCHRONIZE IN A TEST BENCH

(Test Bench Drive Motor Is Not Used)

The Delco-Remy 668 Series High Speed Distributors may easily be synchronized in a test bench, which method is much to be preferred to the use of synchronizing tools.

Proceed by first adjusting the contact separation on both sets of arms to .022 inch, as previously described. Clamp the distributor in test bench vise. Connect the two 6 volt panel test lights to the two primary terminals on distributor. By noting the degree mark on rotary spark gap, at which the stationary set of points open, the movable set may easily be adjusted to precisely 45 degrees later.

1929-32 Chevrolet Ignition Distributors

DELCO-REMY MODELS 633-G and 633-J

(With Electrolock Assembly)

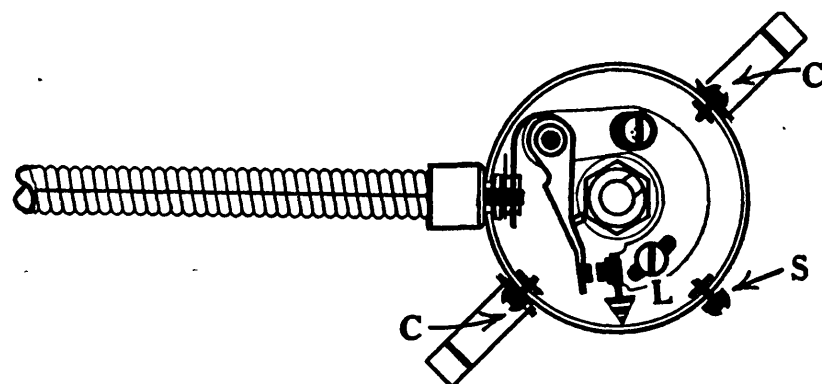


FIG. 14.

1929 Chevrolet Distributor with "Electrolock" Assembly.

HOW TO CHANGE BREAKER POINTS

The operation of changing breaker points on this distributor has purposely been made difficult to foil car thieves. Not only is some little time required to make the change, but a special wrench (see Fig. 16) is necessary, and the mechanic must have a thorough knowledge of how the unit is constructed. (Wrench shown in Fig. 16 will be found listed in the tool section of this Service.)

By referring to Fig. 14 it will be seen that there are 3 screws ("C", "C" and "S"), which anchor the distributor breaker plate assembly to the distributor base. The heads of the screws are on the outside of the base, two of them ("C" and "C") also serving to hold the Distributor Cap spring clips.

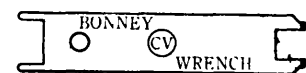


FIG. 16.

Special 1929 Chevrolet Point Changing Wrench.

Proceed as Follows:

1. Remove Distributor Cap and rotor button.
2. Remove screws "C", "C" and "S".
3. Push down on the breaker plate (which is now free).
4. By use of special wrench turn THREADED SCREW PLATE (Part 12, Fig. 15) counter-clockwise. Do not run it all the way off of the insulated stud.
5. Lift breaker arm and spring, which should now be free to slip up and out of base. (The breaker arm spring is slotted, which will allow it to lift off of the insulated stud without entirely removing the THREADED SCREW PLATE).
6. The stationary point is changed by removing LOCKING SCREW "L" (Fig. 14) and lifting the point up and out.

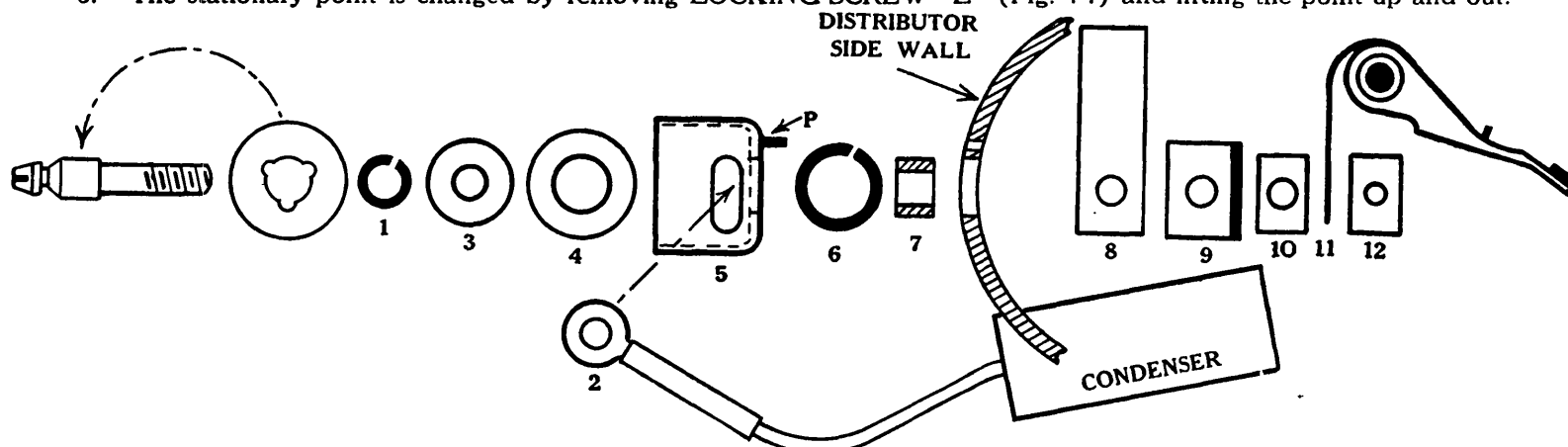


FIG. 15.

1929 Chevrolet "Electrolock" and Breaker Point Assembly. Parts shown in order of assembling.

7. To assemble proceed in reverse order, making sure that the STAKE PIN "P", on Ferrule #5 (Fig. 15) enters hole provided for it in DISTRIBUTOR SIDE WALL.

IMPORTANT: Tighten the THREADED SCREW PLATE securely (using special wrench), to assure proper electrical connections.

TO REMOVE ELECTROLOCK ASSEMBLY

Proceed as in the case of changing points, excepting that the THREADED SCREW PLATE is entirely removed from the insulated stud.

Before reassembling lay parts out in exactly the same order as shown in Fig. 15.

The thin fiber washer, with serrated hole (shown next to the threaded stud), should be slipped over the shoulder to a position indicated by arrow.

The small lock washer #1 should next be placed on stud.

Large fiber washer #4 and steel washer #3 should be placed inside (and tight against the end) of Ferrule #5.

Push Condenser Terminal #2 thru hole in Ferrule, and insert the threaded stud.

Lock washer #6 comes between the Ferrule and DISTRIBUTOR SIDE WALL.

Slip fiber bushing #7 over stud, and move entire assembly up against DISTRIBUTOR SIDE WALL. Make sure STAKE PIN "P" lines up with hole provided for it in distributor base.

Slip fiber strip #8 over stud with long end so it will insulate contact arm spring from distributor housing.

Slip fiber piece #9 over stud with offset part down.

Follow with plate #10 (make sure curve conforms with distributor base).

Catch THREADED SCREW PLATE #12.

From here on proceed as described under "Changing Points."

1929 FINGER TIP CONTROL SWITCH

Designed and manufactured by the Aid Manufacturing Company of Chicago, Ill.

This switch, which is mounted at foot of steering column, is one of the outstanding 1929 developments in modern electrical equipment, combining a starting switch, lighting switch, and horn switch in one unit, all switches being controlled by the knurled button in center of the steering wheel. To operate the starting motor the knurled button is pulled upwards, which movement closes the starting motor circuit, thus doing away with the conventional foot starting switch, which at its best is difficult to locate. The lights are controlled by turning the button clockwise, there being three positions; namely, dim, tilt, and bright. The horn is operated by pressing the button downwards, the same as in the past. All of the switching contacts are made within the switch itself, including that of completing the horn circuit, the operating motion being transmitted from the button through a rod in the steering column.

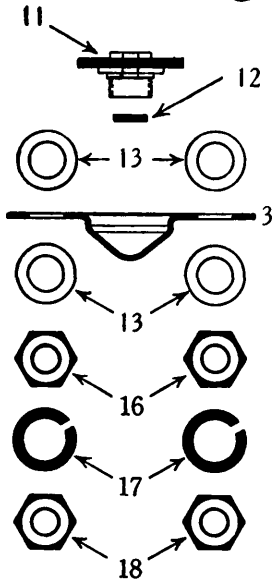
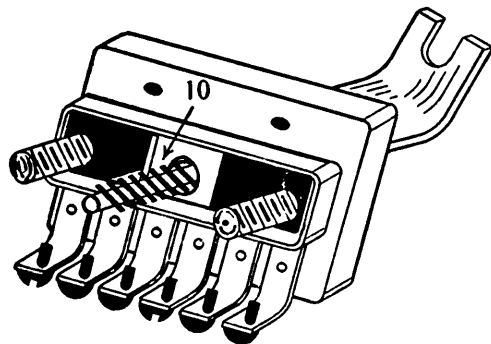


FIG. 17.

Aid "Finger Tip Control" Steering Column Switch with parts shown in order of assembling.

This switch is now standard equipment on all models of the Elcar, Roosevelt, Whippet, and Willys-Knight automobiles.

TO REMOVE SWITCH FROM CAR

Fig. 17 shows the switch with the parts in the order which they are removed from the unit. To expedite this operation on the Whippet automobiles it is recommended that the carburetor be first removed.

Proceed as Follows:

1. Disconnect one of the heavy battery leads from the battery (this will "kill" the electrical system, and avoid danger from fire due to short circuits).
2. Disconnect the small wires from row of six screws on front of switch.
3. Remove thin brass nuts #18 (Fig. 17), lock washers, heavy starting cables, and the ammeter feed wire.
4. Remove thick brass nuts #16.
5. This will allow fiber washers #13, the aluminum cover plate #3, and the two fiber washers behind the plate to slip down and off the studs. (If necessary, tap the switch with a light blow to free cover).
6. Push up on starter contact #11 (working thru the opening at bottom of switch), and slip locking pin #12 out of hole in actuating rod. (This locking pin fits loosely in a hole drilled thru actuating rod, and is held in place by the cup-like rim on starter contact. The assembly is very similar to an engine valve spring retaining cup.)
7. Slip spring #10 from actuating rod.
8. Remove the two nuts holding switch to base of steering column, and slip switch body down and off the actuating rod.

In assembling the unit proceed in the reverse order, making sure that one each of fiber washers #13 are placed above and below the aluminum cover #3, on each stud.

The six terminal screws on switch are as follows, naming from outside of car: (1) Dimming Resistance (or side lights, if used); (2) Lower Head Light Beam; (3) Feed; (4) Horn; (5) Upper Head Light Beam; (6) Tail.

FORD, MODEL "A" STARTING MOTORS

ABELL DRIVE ON EARLY MODELS

The first 492,510 Ford Model "A" pleasure cars and trucks were equipped with the "Abell" starting motor drive. This unit works on the "inertia" principle, and in some respects is similar to the Bendix drive; however, in place of the threaded shaft and nut (the Bendix job), the Abell drive employs a cylindrical cam to accomplish the same purpose.

CHANGE TO BENDIX DRIVE, OCTOBER 1928

FORD FLYWHEEL REDESIGNED

After October 1st, 1928 Ford Model "A" pleasure cars and trucks, cars #492,511 and up, were equipped with Bendix starter drives (Ford part #A-11350-C). At the time this change was made the engine flywheel was redesigned, making it impossible to use the new starting motor on early model cars.

NOW POSSIBLE TO REPLACE ABELL DRIVE WITH BENDIX

For the purpose of servicing cars equipped with Abell drive it is necessary to use a SPECIAL BENDIX TYPE, known as the SERVICE STARTER DRIVE (Ford part #A-11350-DR). Complete instructions on how to rebuild the early style starting motors to adapt them to this special drive will be found below. When installing the rebuilt unit with Bendix drive do not place shims between starting motor and flywheel housing. Whenever a change in starting motors is made the teeth on flywheel ring gear should be carefully inspected by looking thru the starter motor opening, while engine is slowly turned by hand. If the teeth show signs of damage a new ring gear should be installed.

INSTALLATION INSTRUCTIONS

The A-11350-DR Bendix drive is a special type for replacing the Abell starter drive used on Model "A" cars and trucks manufactured previous to October, 1928. Its installation requires reoperation of the armature shaft and of the end bearing of the starting motor; for that reason the following instructions should be closely followed. There are two types of Ford Model "A" starting motors on which this 11350-DR drive can be mounted, the first type having a ball bearing in the starting motor end plate and the second a plain bearing. Ball bearing equipped starting motors can be easily distinguished from the plain bearing type by noting the ball bearing retainer plate which is bolted to the end plate. The reoperation of these two starting motors for installation of the 11350-DR drive is slightly different, as noted below.

INSTALLATION ON BALL BEARING EQUIPPED STARTING MOTORS

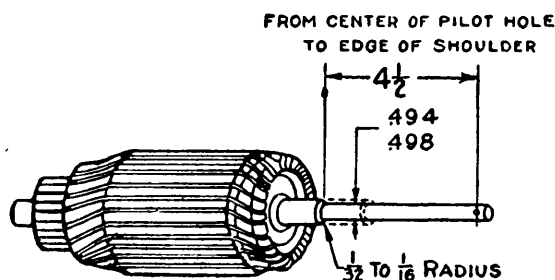


FIG. 1. Armature Dimensions to take Bendix Service Starter Drive. 1. Remove armature from starting motor and withdraw bearing from armature shaft; bearing can then be forced off by dropping the end of the armature shaft on a lead block. 2. Before turning down armature shaft make certain it is not bent; if any such condition is shown when the shaft is indicated on centers, shaft should be straightened before starting reoperation. 3. The file-hard surface of the portion to be turned down can be ground off, thus making the turning operation much easier. 4. With the armature mounted in a lathe, turn down the enlarged portion of the shaft to a diameter of .494-.498 or flush with existing diameter at the outer end, and back to a point exactly $4\frac{1}{2}$ inches from the center of the pilot screw hole in the armature shaft (see Fig. 1). **NOTE** $\frac{1}{32}$ -INCH TO $\frac{1}{16}$ -INCH RADIUS AT THE SHOULDER AS SHOWN BELOW AND DESCRIBED LATER. Do not try to remove all the metal in one cut, also make the last cut a very light one; this helps to obtain the correct diameter and to keep the surface as smooth as possible. The turned down diameter should merge into the similar existing diameter at the outer end without leaving any shoulder or tool marks of any kind at the point where the turning started.

5. In completing the turning operation care must be exercised not to mar the surface of the shaft back of the $4\frac{1}{2}$ inch line, inasmuch as this is the bearing portion of the armature shaft. **LEAVE A RADIUS OF BETWEEN $\frac{1}{32}$ -INCH AND $\frac{1}{16}$ -INCH AT THE $4\frac{1}{2}$ INCH LINE** where the larger diameter merges into the newly turned diameter (see Fig. 1). Do not leave a sharp tool mark at this point and avoid any undercutting of the shaft because this results in possible breakage of the shaft at any such weak point. **THE RADIUS IS OF SPECIAL IMPORTANCE, INASMUCH AS IT STRENGTHENS THE SHAFT AT THE POINT OF THE CHANGE IN DIAMETER.**

6. After completing the turning operation smooth the newly turned diameter by a light touch with a file with the shaft turning in a lathe.

7. Before reassembling armature shaft remove all chips and dirt which may have wedged in between the armature wires; reassemble the ball bearing up against the shoulder on the armature shaft, and make sure it is well packed with lubricant.

8. In assembling the motor use a new ball bearing retainer plate, (Ford part No. A-11133-R), or bore out the present plate to a diameter of $1\frac{1}{16}$ inch so that the stop nut on the end of the Bendix drive can pass through this retainer plate (see Fig. 2).

9. Before assembling the Bendix drive on the starting motor, rub a little grease or oil on the armature shaft so as to prevent any rusting between the Bendix shaft and the armature shaft. Do not place any

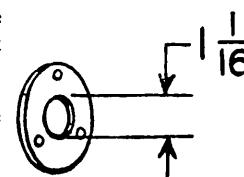


FIG. 2. Dimensions for Ball Bearing Retainer Plate.

lubricant on the screw threads on the shaft. When assembled, the stop nut of the Bendix drive should be against the shoulder on the armature shaft at the $4\frac{1}{2}$ inch line, but in assembling the drive it should not be necessary to compress the spring more than $\frac{1}{16}$ inch. If you must compress the spring more than $\frac{1}{16}$ inch to insert the spring screw pilot end into the armature shaft, you will find one of the following conditions present: (a) The $4\frac{1}{2}$ inch dimension on the armature shaft is undersize; (b) The ball bearing end plate has not been replaced or the hole bored larger; or (c) In case the starting motor is of the plain bearing type, additional metal should probably be removed from the bearing boss (as described below).

When the Bendix drive has been completely assembled, compress the gear and shaft portion backward, then release it and make certain the drive freely resumes its original position. An armature shaft diameter of over .498 inch or a bent shaft restricts the free sliding movement of the gear and shaft portion of the drive on the armature shaft, and this results in failure to mesh and damage to the pinion and flywheel gears.

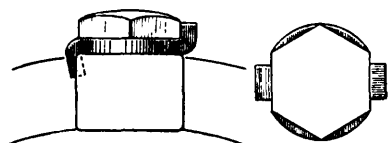


FIG. 3.
Method of Locking Bendix Screws.

10. In assembling the Bendix drive, make certain that the two lugs on the end of the head portion fit into the slot of the sleeve portion; turn down the head screw until it holds the spring tightly in place and bend up the lip of the lock washer against a FLAT SIDE of the head of the screw (see Fig. 3). A new Woodruff key, No. 5, should be used if the old one is sheared or damaged. In assembly of the head portion make certain the Woodruff key fits into the keyway slot of the head, and that the key is not pushed forward into the space between the head and sleeve. With no Woodruff key connection between the Bendix drive head and the armature shaft the driving torque is transferred to the pilot of the screw which will

soon shear under such conditions.

INSTALLATION ON PLAIN BEARING STARTING MOTORS

Follow the same instructions listed in paragraphs Nos. 2, 3, 4, 5, 6, 7, and 10, omitting No. 1, and substitute the following for No. 8 paragraph:

8. The face of the plain bearing or boss portion of the starting motor end plate must be cut back a distance of $\frac{9}{64}$ inch in order to provide the necessary space for the assembly of the replacement drive. It is best to do this operation in a lathe, being careful after completing it to remove any burr which might have been thrown into the bearing itself. Note Fig. 4 showing that the distance between the mounting face of the end plate and the end of the boss must be $\frac{11}{64}$ inch after completing the facing operation.

In reassembling the starting motor on the engine, remove any shims which may have been used between the starting motor flange and the flange on the flywheel housing.

Before installing the starting motor, the flywheel ring gear teeth should be carefully inspected. It is, of course, difficult to note the meshing or back end of the

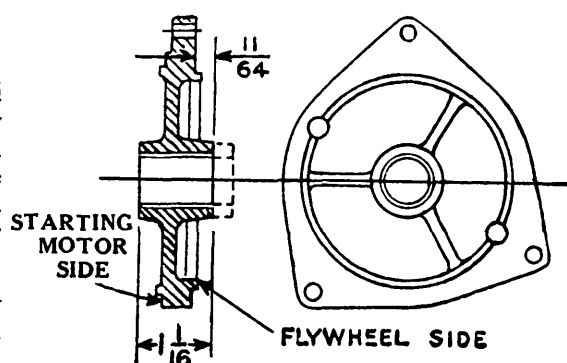


FIG. 4.
Dimensions of STARTING MOTOR END PLATE to take Bendix Service Starter Drive.

teeth from the starting motor hole, but with the aid of a mirror this can be accomplished. If the flywheel teeth are badly damaged, a new ring gear should be installed. Meshing of the pinion gear takes place at two opposite points on the flywheel ring gear and if the teeth at these points are only slightly burred, the worst of these burrs can probably be removed by using a small file; any filing should be in the same direction as the original chamfer and no chamfer should be filed on the side of the tooth originally left unchamfered.

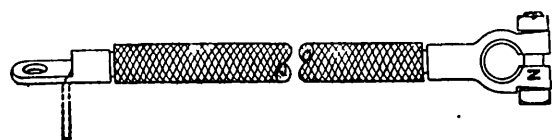


FIG. 5.
Shape to bend Starting Switch Cable Terminal.

NEW STARTER SWITCH SPRING AND BATTERY CABLE

The starter switch assembly spring was changed from an angular to a flat spring, and the top of the starter motor terminal machined flat instead of at an angle so that it will correspond with the spring.

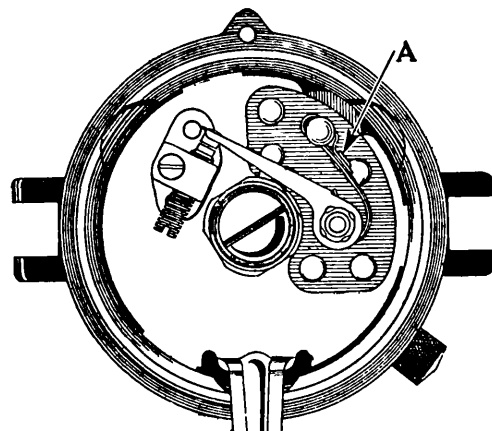


FIG. 7.
Ford Breaker Arm Spring with Riveted Loop and Special Stud.

riveted around the breaker arm spring stud (see "A", Fig. 7), the thickness of the head of the stud increased, and the stud case hardened.

To install the new breaker arm assembly, it is necessary to remove the breaker plate assembly. This, of course, will necessitate retiming the ignition.

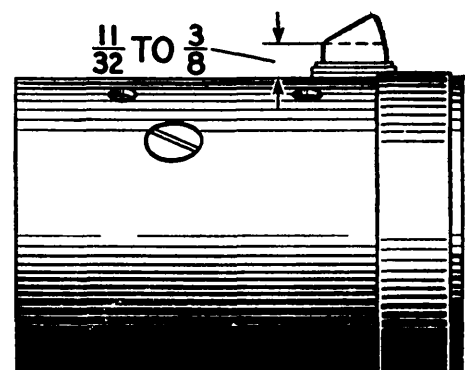


FIG. 6.
Dimensions of Starter Motor Terminal to fit late type Starting Switch.

The change in the switch necessitated making a slight change in the position of the battery to switch cable terminal, the terminal now extending straight out (see Fig. 5) instead of at right angles to the cable as shown in dotted outline.

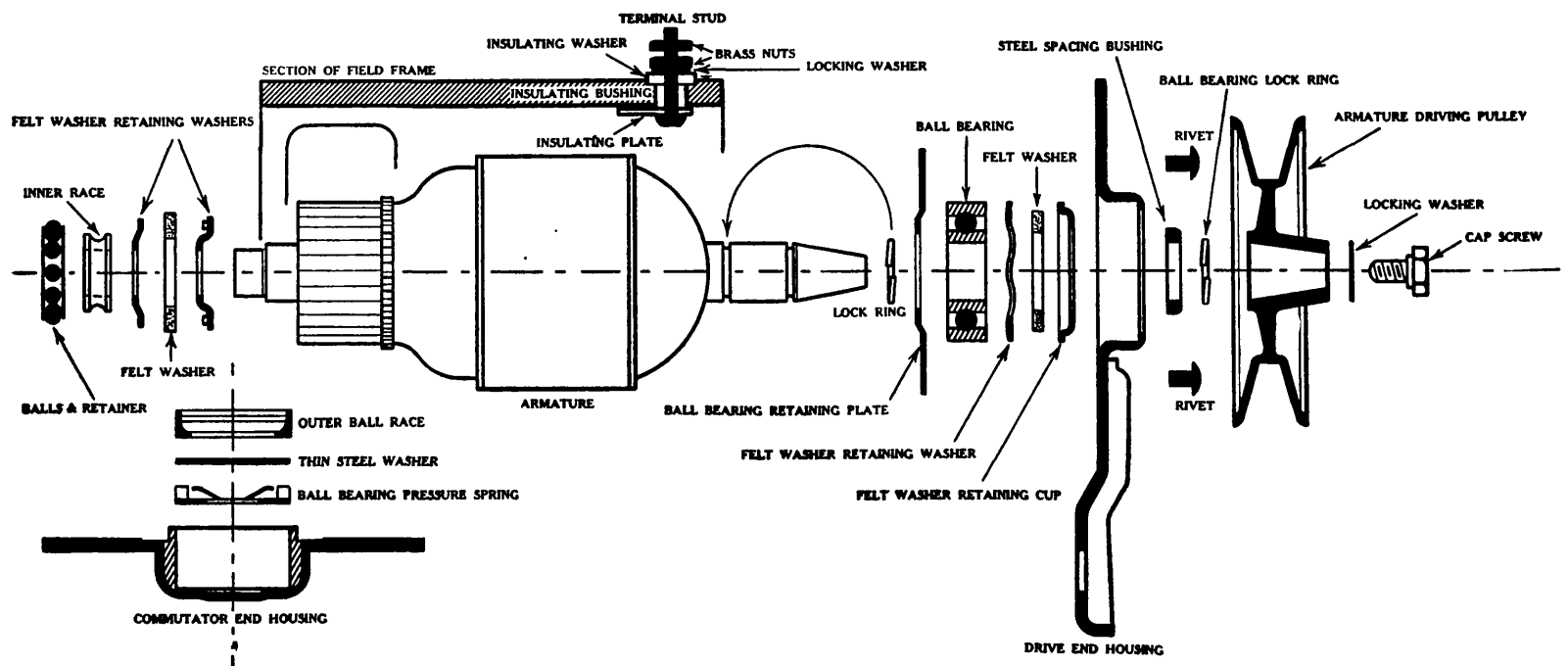
When replacing an old style starter switch assembly with the present design switch, it is necessary to file down the starter motor terminal until the top of the terminal is flat and extends $\frac{11}{32}$ " to $\frac{3}{8}$ " above the surface of the yoke. (See Fig. 6). If the old style battery cable is used with the new switch, it will also be necessary to bend the terminal so that it extends straight out. On the other hand, if a new cable is used with an old switch it will be necessary to bend the terminal at right angles to the cable. (See Fig. 5).

NEW BREAKER ARM ASSEMBLY

As a protection against car theft, the distributor breaker arm spring has been

FORD "A" TWO POLE GENERATORS

DETAIL OF ARMATURE AND BEARING ASSEMBLIES



The use of the six pole "power house" type of Ford Generator was discontinued about May, 1929. Since that time Ford, Model "A" cars have been equipped with a two pole generator.

In assembling Ford Two Pole Generators the parts should be separated into three distinct groups, as shown above. To assemble, proceed as follows:—

1. Assemble commutator end bearing, with felt washer retaining washers, felt, and inner race, as shown in diagram; pressing them into place on armature shaft.
2. Assemble the ball bearing pressure spring (make sure it is the side up as shown), the thin steel washer, and the outer ball race; fitting them into the commutator end housing.
3. Place Lock Ring in groove, as indicated by arrow on diagram.
4. Assemble drive end bearing and washers, as shown in diagram, and rivet ball bearing retaining plate to drive end housing.
5. Fit assembled drive end housing to armature shaft and lock it in place by first slipping on the steel spacing bushing, and then the ball bearing lock ring.
6. Place armature in generator field frame and fit commutator end housing into place.

FORD TWO POLE GENERATOR CHARACTERISTICS

Rotation, L. H., Com. End

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	725.....	6.5
2.....	750.....	6.6
5.....	825.....	7.1
10.....	1050.....	7.8
14.....	1450 (Max.)	7.9

Motoring Freely— $5\frac{1}{2}$ amps. at 6 volts.

Max. Stall Current—22 to 25 amps. at 6 volts.

Field Test— $4\frac{1}{2}$ amps. at 6 volts.

Brush Spring Tension—22 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

1930 DELCO-REMY HIGH SPEED IGNITION DISTRIBUTORS

Type 660

Standard equipment on 1930 DeSoto Straight Eight; Dodge "DC" Straight Eight; Graham Special & Standard Straight Eights, and Oakland "Vee" Eight.

This series of Delco-Remy Distributors uses a four lobe cam and two sets of breaker points connected in parallel, with but one coil and one condenser, for eight cylinder ignition. See Fig. 1.

An entirely new synchronizing tool (Delco-Remy, No. 1838182), has been developed for adjusting this series of distributors. See Fig. 2.

This new synchronizing tool is attached to the distributor shaft by means of a small "U" shaped spring, in the same manner as the old type No. 820751, 6 Cylinder Synchronizing Tool, used on the Chrysler and Buick automobiles.

HOW TO SYNCHRONIZE POINTS

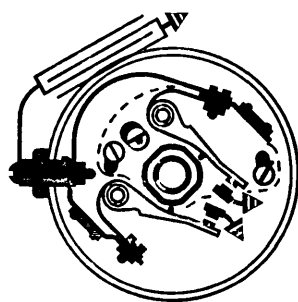


Fig. 1

Delco-Remy Distributor 660-A

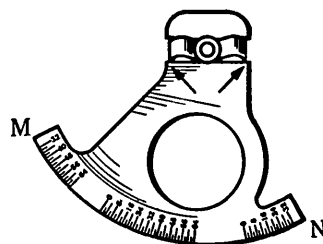


Fig. 2

Synchronizing Tool No. 1838182 for the 660 series of D.R. Eight Cylinder Distributors.

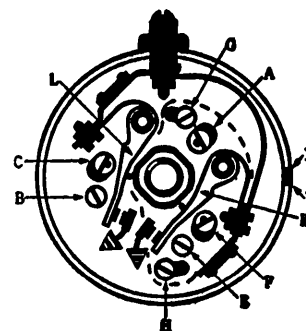


Fig. 3

Adjusting screws on Delco-Remy Series 660 Distributors.

One set of contact points is stationary, while the other set may be moved bodily about the cam as a center. The contact separation of the stationary set "L", Fig. 3, should first be adjusted to .022 inch. This is done by first loosening locking screw "B" and turning the eccentric screw "C" to proper separation. Relock screw "B". It is, of course, understood that the distributor shaft is turned until "the cam follower" is on a cam lobe when this adjustment is made. In the same manner adjust the contact separation of arm "K" using eccentric screw "F" and locking screw "E". The Delco-Remy Eight Cylinder Synchronizing Tool No. 1838182 (see Fig. 2) is held in place by a small "U" shaped spring. Two arrows are stamped on the tool pointing towards the spring ends. The spring end, which has an arrow pointing in the direction of rotation of the distributor to be adjusted, goes in slot on shaft. Turn distributor shaft in direction of its rotation until the graduations on the center of synchronizing tool are near the slot "XY" (Fig. 3) cut in distributor base rim. Continue to slowly turn shaft until stationary breaker arm "L" just starts to open. (For accuracy use a test light in series with the primary circuit.) Note exact graduation mark in center of the synchronizing tool which is in line with point "X" (for right hand rotation) or point "Y" (for left hand rotation), which points are the edges of the slot cut in the distributor base rim. Continue to turn the shaft in the same direction until the corresponding graduation mark (located forty-five degrees farther back along the "N" side of the synchronizing tool for R.H. rotation, or the "M" side for L.H. rotation) aligns with the same edge of the distributor slot. Loosen locking screws "G" and "H" and turn eccentric adjusting screw "A" until breaker arm "K" just breaks contact. The graduations on the synchronizing tool represent flywheel degrees and the distributor must not be out of adjustment more than two degrees of flywheel travel (or one degree of distributor shaft travel).

IMPROVED 1930 FINGER TIP CONTROL SWITCHES

Radical changes in the design and construction of Finger Tip Control Switches have been made since their first appearance in 1929. In order to remove the early model switches from the car it was necessary to loosen the lower switch cover and withdraw a small retaining pin, which held the starting contact in place. (This operation is fully explained on page 28 of this section, under the heading of 1929 Finger Tip Control Switches.) The starting contacts apparently were not designed with sufficient size, area, and carrying capacity, with the result that it was necessary to replace many of the early switches. It was soon found that the switch design did not permit of its easy removal, and a new type was developed to overcome this difficulty.

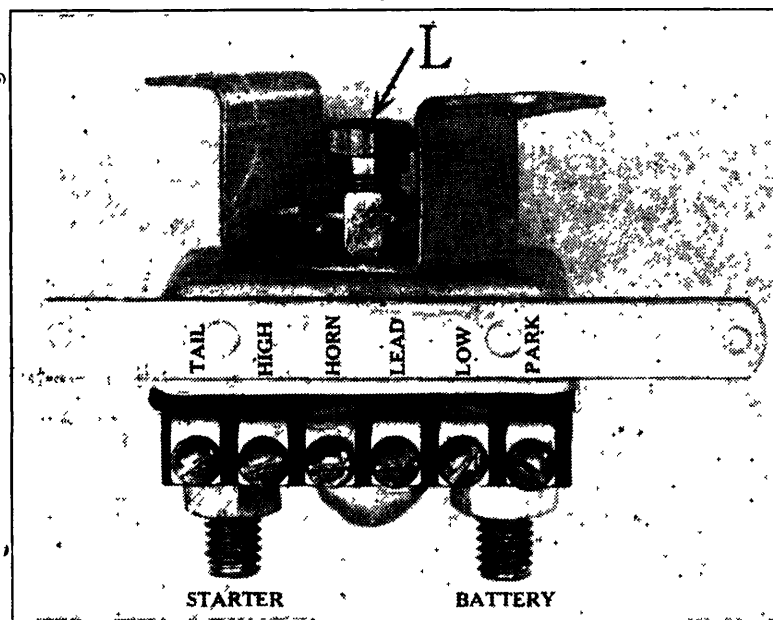


Fig. 1

Figure 1 shows a Briggs & Stratton improved Switch No. 50160, for Willys-Knight, Models 66-B and 70-B, Willys Six, Model 98-B, and Whippet, Models 96-A and 98-A. This new switch may be used to replace the early type, providing slight changes are made to the end of the actuating rod (the rod which carries the horn button, and extends down through the steering column and through the switch). Figure 2 shows the end of this rod as it appears after removing the original switch.

Remove the two screws "B" (Fig. 2) which hold the oil reflector, and throw this unit away. Shaft "A" (Fig. 2) extends but a short distance up into the end of actuating tube "C". It is held in place by pin "D", which pin must be driven out before shaft "A" can be removed. On some cars it is possible to pull the entire actuating tube "C" right up through the steering col-

umn, and remove it from the car (providing the horn button does not hit the roof of the car before the tube is entirely free). If the tube can be removed it is a simple matter to hold it in a vise and punch out pin "D". If this operation is performed on the car, extreme care must be exercised not to bend the tube "C". With pin "D" removed pull out the short shaft "A". Replace it with the knurled extension shaft "E", Figure 3.

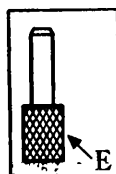


Fig. 3

When knurled shaft "E" has been driven as far as possible into place it will appear similar to Figure 4.

A hole must be drilled through the tube and knurled shaft for a new retaining pin, "P" Fig. 4, which should be riveted over on both ends. The new switch is complete in itself, and turning motion to operate it is transmitted from the horn button and actuating rod to the switch proper by a split chuck and clamping nut. Slightly loosen clamping nut "L" (Fig. 1), and insert knurled shaft "E". Securely tighten nut "L". Bolt legs of switch to bottom of steering column.

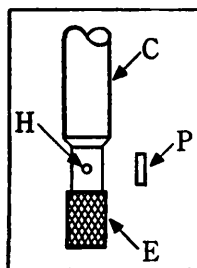


Fig. 4

IMPORTANT: After switch is in place, and before any wires are attached, have someone pull up on the horn button (as though to start engine) and carefully observe if there is at least 1/32" clearance between the top of clamping nut "L" and the bottom of the steering gear. If there is no clearance, or nut "L" hits, the starting contacts will not close. To remedy, place plain washers between legs of switch and steering gear. Attach cables and wires.

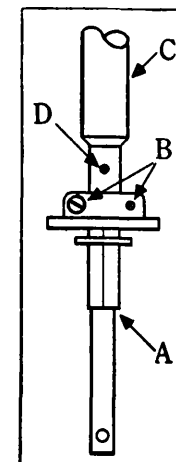


Fig. 2

AID ROUND TYPE

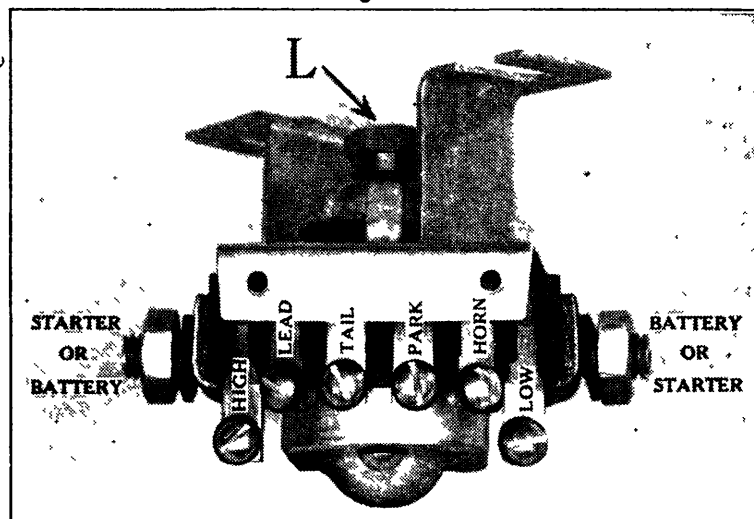
FINGER TIP CONTROL SWITCH No. 805, STANDARD EQUIPMENT ON THE NEW
WILLYS STRAIGHT EIGHT, MODEL 8-80

Fig. 5

The starting contacts of this switch are very much heavier than those previously used, and in all probability trouble will not develop from this source. With the new switch the horn circuit may be fused, which was not possible before.

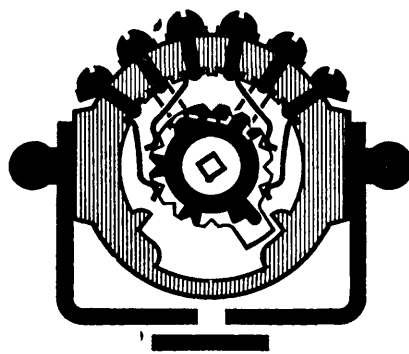


Fig. 6

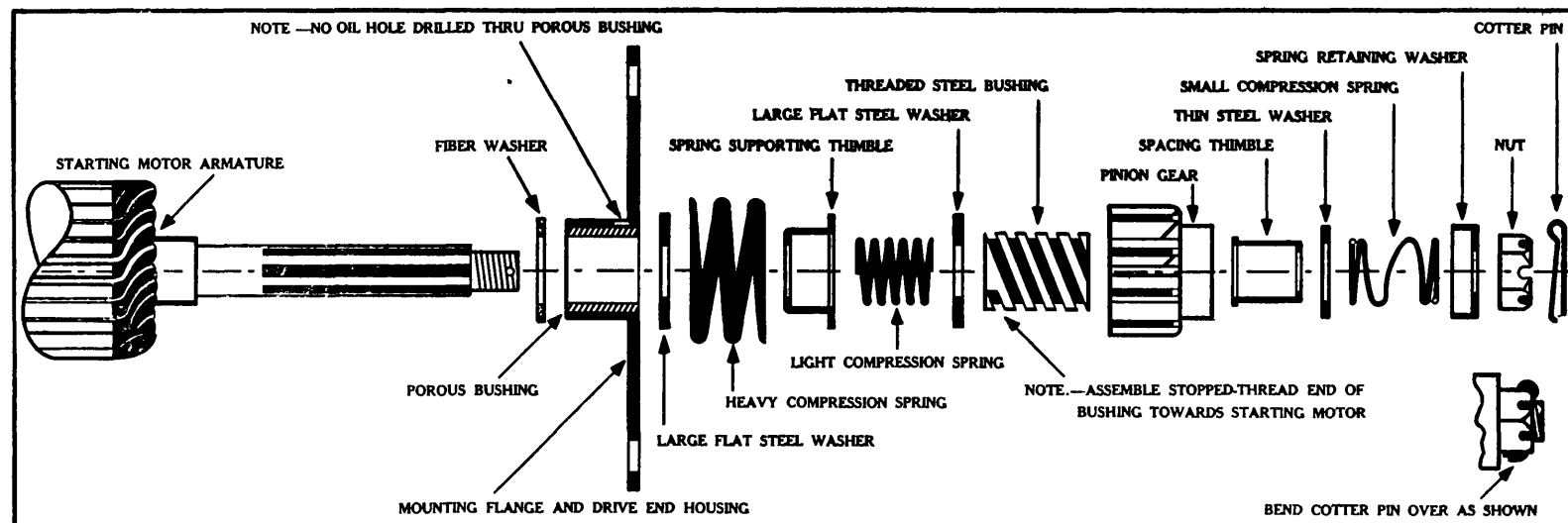
Figure 6 shows the internal construction of the switch. It will be seen that the wires are not attached in the same order as previously.

1931 ECLIPSE BENDIX DRIVE

Type RCE-11-10T Used on American Austin Automobiles

The shock resulting from the meshing of the starting motor pinion with the flywheel is absorbed in a very unique manner. Instead of using the conventional Bendix spring, a series of compression springs are employed for the same purpose.

DETAIL OF ARMATURE AND PARTS ASSEMBLIES



The drive is made up of some thirteen different parts, and it is very important in reassembling the drive on the armature shaft that each part be placed in its proper position. By referring to the diagram (which shows each part in the correct position for assembling on the armature shaft), and arranging the component parts on the work bench in exactly the same order in which they are shown on the diagram, no difficulty should be experienced in assembling the drive.

The two thrust washers, labeled "large flat steel washers" on the diagram, are special, both in size and heat treatment; however, they are identical in size, and are interchangeable. The reason that both washers are heat treated is on account of the heavy load imposed upon the thrust washer at the **rear of the drive**, and because of the fact they might be interchanged when assembling. Should the rear washer be left out by mistake when assembling, or placed in some other position, an undue strain will be placed on the starting motor shaft, which will damage it after a short period of use. If, for any reason, it becomes necessary to install new washers, use only those manufactured by the Eclipse Machine Company which, of course, are of the correct size and properly hardened.

In reassembling the various parts on the armature shaft it is most important that the anti-drift spring, labeled "small compression spring" on the diagram, be compressed beyond the end of the anti-drift spring sleeve, labeled "spacing thimble" on the diagram. If this is not done, there is a possibility of the end spring coil slipping in between the thimble and the pinion stop cup (labeled "spring retaining washer" on the diagram) when the castellated nut is tightened. This nut must be tightened very firmly, thereby drawing the various parts securely against the armature shaft shoulder. To properly tighten the nut the armature must be rigidly held, which may be done by placing the armature assembly in a vise having copper jaws. The cotter pin locking the castellated nut should be a tight fit in the armature shaft hole, and **should not be over one and a quarter inches in length**. It is important that both prongs be bent backwards over the nut, as shown on the diagram, or interference will result between the cotter pin prongs and the flywheel bell housing. The Eclipse Machine Company specifically warn mechanics against tampering with the anti-drift or "small compression spring," as it is easily bent and any distortion will impair its action.

Failure of the pinion gear to mesh with the flywheel is usually the result of a gummy or gritty condition of the pinion screw threads. They should be cleaned with kerosene and re-oiled sparingly with a very light grade of oil, in the same manner as the conventional Bendix Drive. The proper lubrication of the working parts of this drive is most important. The triple threads of the screw sleeve (labeled "threaded steel bushing" on diagram) are covered with a light film of oil when originally installed. Should the threads become exceedingly dry, re-oil sparingly, using a **very light grade of oil**. Under no circumstances use a heavy oil or grease. If, after a period of service the splines on the armature shaft become dry, or in the event it becomes necessary to remove the splined sleeve from the armature shaft, it is advisable to apply a small quantity of graphite grease or heavy oil to the splined part of the armature shaft.

1931 DELCO-REMY HIGH SPEED IGNITION DISTRIBUTOR TYPE 661-B

STANDARD EQUIPMENT ON THE 1931 OAKLAND "VEE" EIGHT AUTOMOBILES

The 661-B Delco-Remy Distributor employs an **eight lobe cam** and **two sets** of breaker points connected in parallel, which are designed to operate **simultaneously**. The unit has but one condenser and controls a single ignition coil. It no longer is necessary to synchronize Oakland Distributors to assure equal intervals between engine explosions, as the eight lobed cam automatically takes care of this important detail. Provision is made for adjusting the two sets of breaker points, that they may be set to operate simultaneously.

The Delco-Remy, type 661-C, D, F, G, and J Distributors were developed for 1932 car use. These units differ from the 1931 type 661-B Distributors in that they employ but **ONE** breaker assembly, actuated by an eight lobe cam. Because of the eight lobe cam and single breaker there is no problem of synchronizing. The condenser is mounted inside the distributor cup, on the breaker plate.

For special instructions on adjusting the type 661-C, D, F, G, and J Distributors see 1932 pages of this section.

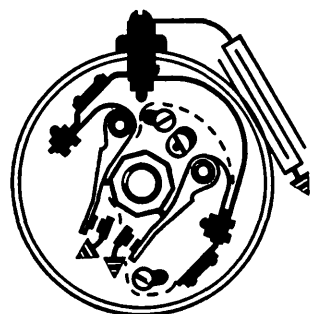


Fig. 1

Internal circuits of Delco-Remy, 661-B High Speed Ignition Distributors.

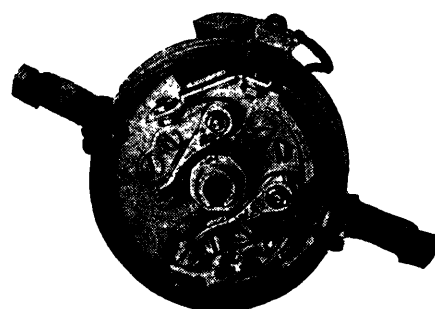


Fig. 2

The 661-B Delco-Remy Ignition Distributor used on 1931 Oakland, Model 301 automobiles.

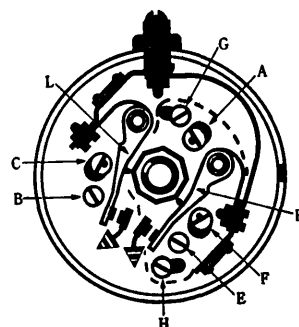


Fig. 3

Adjusting Screws on Delco-Remy, 661-B Distributor.

HOW TO ADJUST THE 661-B DISTRIBUTOR

One set of contact points "L," Figure 3, is stationary, while the other set "K" may be moved bodily about the cam as a center. The contact separation of both sets should first be adjusted to .018 inch. This is done by loosening locking screw "B" and turning eccentric screw "C" to the proper separation, when setting the stationary assembly "L," and by loosening locking screw "E" and turning eccentric screw "F" to the proper separation, when setting the movable assembly "K." It is, of course, understood that the distributor shaft is turned until the "cam followers" are on a cam lobe when the contact separation adjustments are made.

After making the point adjustments it next becomes necessary to locate the movable breaker assembly "K" that it will open at exactly the same instant as the stationary assembly "L." In other words, adjust the distributor so that the two sets of points will function simultaneously. This adjustment can best be made in a test bench making use of the rotary spark gap and a coil. Place the distributor in the bench, and connect in the coil and battery. Insulate the movable breaker assembly "K," and bring one of the sparks resulting from the action of the stationary assembly "L," over the zero on the rotary spark gap. Next insulate the stationary assembly, and operate the movable points. If the distributor is properly adjusted one of the sparks resulting from the action of the movable assembly will also jump directly over the zero on the rotary gap. If such is not the case loosen locking screws "G" and "H," and by turning eccentric screw "A," move the entire breaker assembly "K" until the spark does come directly over the zero graduation on the spark gap. After completing adjustments relock all locking screws.

It is possible to adjust the 1931 Delco-Remy 661-B Distributor by using the old 1838182 Delco-Remy Synchronizing Tool, description of which will be found on page 32 of this section. However, when this tool is used the procedure to follow is not the same as when synchronizing the four lobe 660, Delco-Remy Distributors. Attach the tool in the conventional manner, and insulate the movable breaker assembly. Observe the exact graduation mark on the edge of the tool, which is opposite one corner of the notch cut in the distributor base, when the stationary assembly opens. Next insulate the stationary assembly, and determine if the same graduation mark on the same scale is opposite the same corner of the distributor base notch, when the movable assembly opens. If not, adjust by moving the complete assembly, as explained above.

Modern Practices in Valve and Ignition Timing

THE WEIDENHOFF MOTOR GAUGE

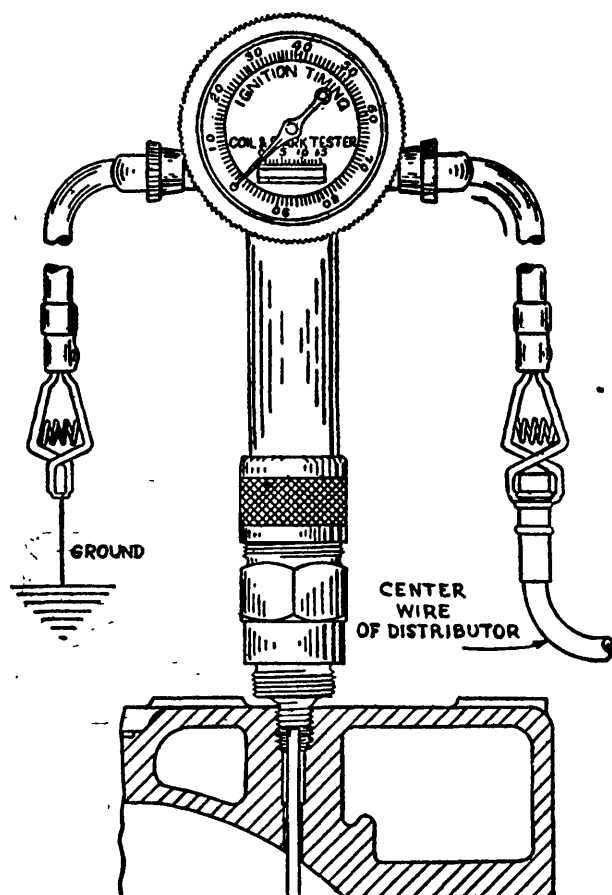


Fig. 1

adapters and rods, that it may easily be attached to any engine, either thru the spark plug holes, or thru special $\frac{1}{8}$ inch pipe size holes located on some motors for this purpose. The complete assortment of rods, supplied with each set, makes the Gauge absolutely universal. These rods are designed to reach thru the cylinder walls and engage with the top of the piston, thus transmitting the amount of piston movement to the direct reading dial indicator. Figure 1 shows the Motor Gauge mounted on an engine originally built with a drilled and threaded timing hole located directly above the piston.

DESCRIPTION OF INSTRUMENT

The Motor Gauge timing device consists of an accurate micrometer dial (direct reading in thousandths of an inch), and suitable



Fig. 2

INSTRUCTIONS FOR USING MOTOR GAUGE

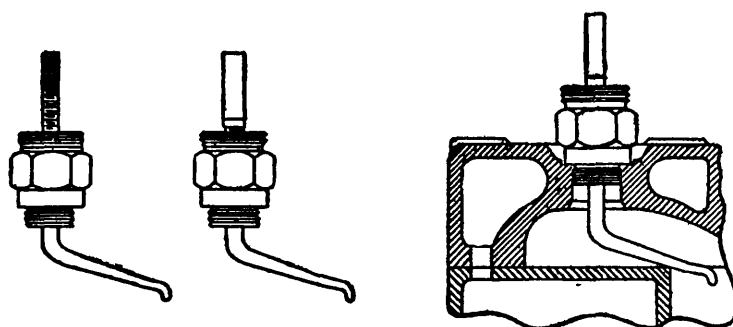


Fig. 3

Fig. 4

Fig. 5

IMPORTANT! The micrometer indicator dial is designed to make six complete revolutions. Each revolution represents one hundred one-thousandths of an inch, or one-tenth of an inch of piston travel. From this it can be seen that the permissible limit of rod travel is six-tenths, or slightly over one-half an inch. That the instrument may not be damaged thru abuse, by forcing the micrometer indicator beyond its limits, a special height gauge (see Figure 2) is supplied, which should always be used before attaching the indicator to the rod and adapter. **WITH THE PISTON ON TOP DEAD CENTER THE ROD SHOULD NOT PROJECT ABOVE THE TOP OF THE HEIGHT GAUGE.** Threaded

adjustments will be found on all rods to bring their length within proper limits.

1. Remove all spark plugs and see that piston of cylinder being timed is below top dead center.
2. Consult chart, select adapter and rod specified, placing rod through adapter (Figure 3), and screw pilot on rod, hand tight (Figure 4). Pass rod through the timing plug or spark plug hole (Figure 5), as the model of the engine requires, and tightly screw the threaded portion of the adapter into the cylinder head. When straight rods are used see that they are within the cylinder wall.

THE WEIDENHOFF MOTOR GAUGE (Continued)

3. Locate engine top dead center by using the heighth gauge (Figure 6). If rod has been properly set with heighth gauge, a reading of two or three hundred-thousandths, or two or three complete turns of the gauge hand will show on the indicator.

4. Screw gauge onto adapter (Figure 7), and ground one wire. Connect other wire to center high tension wire after removing it from the distributor cap.

5. When rods numbers 1, 2, 3, 7, 17, 20, 22 and 26 are used, see that they rest upon engine block, and the finger of the rod does not rest on piston, but is within cylinder wall; otherwise loose movement of rod will give a variation of readings.

6. Bring piston up very slowly on compression stroke, which is indicated by escape of air through hole or slot in adapter, until piston engages rod, which will be indicated by movement of indicator hand. Continue moving crank handle slowly by tapping, until piston reaches top dead center, which is indicated by indicator hand coming to full stop and then tending to move in reverse direction. Move indicator to LEFT, until it reads ZERO, which is top dead center.

7. Top dead center may also be located by using the fan blades to turn engine, which is easily done on most engines when all spark plugs have been removed. Consult chart regarding timing of engine, and proceed as follows: Should ignition timing occur .030 after top center, move dial to LEFT thirty lines (dial calibrated in .001 of an inch) and tap crank handle lightly until hand of indicator points to zero. If ignition timing occurs .030 before top dead center, locate top center as described above. Turn dial of indicator to left thirty lines, reverse engine, by using fan, until hand passes the zero point about .025, then slowly bring up piston and stop at zero. By proceeding in this manner all "back lash" is eliminated.

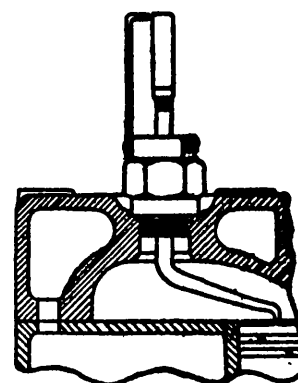


Fig. 6

8. Remove high tension wire from center of distributor and connect it to either terminal of the gauge, ground other terminal, and turn ignition switch "on." In such cases, where wire cannot be removed from center of distributor, remove high tension wire from coil and put one terminal of Motor Gauge in the coil connection and ground the other.

9. See that rotor of distributor is exactly in line with spark plug wire leading to number one cylinder, or the cylinder being tested.

10. Set ignition points in direction of rotation by either moving cam or complete housing of distributor, depending upon system being tested, until flash appears in indicator. Care must be taken not to move points beyond opening position.

11. Make complete turn of engine to ascertain if ignition fires at proper setting.

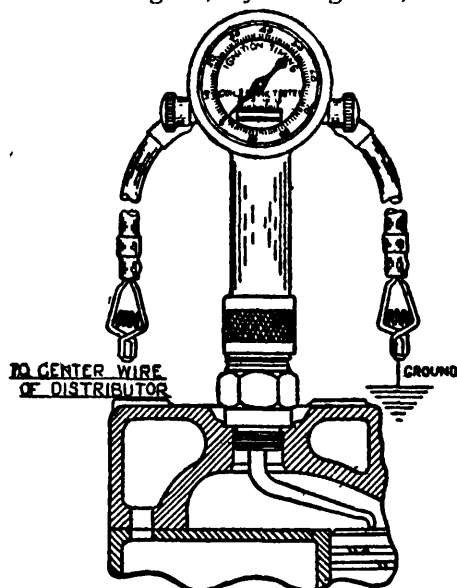


Fig. 7

1930 Valve and Ignition Timing Specifications

COMPILED FOR USE WITH WEIDENHOFF MOTOR GAUGE

1931 Passenger Cars	Adapter	Rod	Stroke	Ignition Timing	Before or After T.D.C.	Spark Re- tard, Ad- vance or Set	Valve Timing Intake Valve Opens	Before or After T.D.C.	Firing Order	Valve Clearance		Breaker Contact Separation	Spark Plug Gap (In.)
										Intake	Ex- haust		
AUBURN 6-85	102	2	4 3/4	.023	B.T.C.	Adv.	.008	B.T.C.	1-5 3-6-2-4	.010	.010	.022	.025
" 8-95	102	2	4 3/4	.040	B.T.C.	Adv.	.008	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.022	.025
" 8-98	102	2	4 3/4	.061	B.T.C.	Set	.009	B.T.C.	1-6 2-5-8 3-7 4	.010	.010	.022	.025
" 125	102	2	4 1/2	.060	B.T.C.	Adv.	.008	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.022	.025
AUSTIN	104	8	3 1/2	.020	B.T.C.	Adv.	T D C		1-3-4-2	.003	.003	.018	.020
BUICK 850	113	31	4 1/4	.055	B.T.C.	Adv.	.001	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.018	.025
" 860	113	31	4 3/8	.051	B.T.C.	Adv.	.001	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.018	.025
" 880-890	113	31	5	.042	B.T.C.	Adv.	.001	B.T.C.	1-6 2-5-8-3-7-4	.010	.010	.018	.025
CADILLAC 355	104	2	4	.025	B.T.C.	Adv.	.030	B.T.C.	{1L-4R-4L-2L {3R-3L-2R-1L	.004	.006	.020	.025
" 370	113	33	4	.068	B.T.C.	Adv.	T D C		{1-4-9-8-5-2 {11-10-3-6-7-12	.030	.030	.022	.025
" 452	113	33	4	.037	B.T.C.	Adv.	T D C		{1-8-9-14-3-6-11-2 {15-10-7-4-18-12-5-16	.030	.030	.016	.025
CHRYSLER 8 Silver Dome	113	19	3 3/4	.043	B.T.C.	Adv.	.005	A.T.C.	1-5-3-6-2-4	.006H	.008H	.018	.025
" 8 Red Head	104-103	29-12	4 1/4	.048	B.T.C.	Set	.011	A.T.C.	1-6-2-5-8-3-7-4	.011	.012	.020	.022
" Imp. 8 Sil. Dome	104-103	40-12	4 1/4	.040	B.T.C.	Set	.011	A.T.C.	1-6-2 5-8-3-7-4	.011	.012	.020	.022
" 8 Red Head	104-103	29-12	5	.047	B.T.C.	Set	.014	A.T.C.	1-6-2-5-8-3-7-4	.009	.009	.020	.022
" Six CM Sil. Dome	104-103	40-12	5	.038	B.T.C.	Set	.014	A.T.C.	1 6-2 5-8-3-7-4	.008	.009	.020	.022
" " Red Head	104-103	2-12	4 3/4	.034	B.T.C.	Set	.014	A.T.C.	1-5 3-6-2-4	.011	.012	.020	.022
CORD	104-103	40-12	4 3/4	.026	B.T.C.	Set	.014	A.T.C.	1-5 3-6-2-4	.011	.012	.020	.022
CUNNINGHAM V9	104	29	4 1/2	.060	B.T.C.	Adv.	.008	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.022	.025
DE SOTO SIX Silver Dome	102	1	5	.055	A.T.C.	Ret.	.010	A.T.C.	1-5-4-8-6-3-7-2	.0015	.003	.018	.022
" " Red Head	104-103	2-12	4 1/4	.055	B.T.C.	Set	.012	A.T.C.	1-5-3-6-2-4	.011	.012	.020	.022
" " EIGHT	104-103	40-12	4 1/4	.031	B.T.C.	Set	.012	A.T.C.	1 5 3-6 2-4	.011	.012	.020	.022
DOGE 6 DH	104-103	29-12	4 1/4	.060	B.T.C.	Adv.	.014	A.T.C.	1-6-2 5-8 3 7-4	.011	.012	.020	.022
" 8 DG	104-103	2 12	4 1/4	.032	B.T.C.	Set	.014	A.T.C.	1-5-3-6 2-4	.011	.012	.020	.022
DUFSENBERG	104-103	29-12	4 1/4	.019	B.T.C.	Set	.014	A.T.C.	1-6-2-5-8-3-7-4	.011	.012	.020	.022
DUFANT 610	104	8	4 3/4	.043	B.T.C.	Adv.	.002	B.T.C.	1-6-2 5-8-3 7-4	.025	.025	.022	.022
" 612	102-103	2 12	4 1/4	.021	B.T.C.	Adv.	T D C		1-3-4-2	.012	.012	.020	.022
" 614	104-103	2 12	4	.011	B.T.C.	Adv.	.008	A.T.C.	1-5-3-6 2-4	.012	.012	.020	.022
ELCAR 75A	104-103	2 12	4	.011	B.T.C.	Adv.	.008	A.T.C.	1-5-3-6 2-4	.012	.012	.020	.022
" 96	102	2	4 3/4	.018	B.T.C.	Adv.	T D C		1-5-3-6 2-4	.006	.008	.024	.025
" 130-140	102	2	4 3/4	.006	B.T.C.	Adv.	.009	A.T.C.	1 6 2 5-8 3-7-4	.006	.008	.020	.025
ESSEX Super Six	104	2	4 3/4	.034	B.T.C.	Adv.	.009	A.T.C.	1-6-2-5 8-3-7-4	.006	.008	.020	.025
FORD	104	2	4 3/4	.041	B.T.C.	Set	.039	B.T.C.	1-5-3-6-2-4	.004	.006	.020	.022
FRANKLIN S-15	102	7	4 1/4	T D C		Ret.	.018	B.T.C.	1 2 4 3	.015	.015	.020	.035
GARDNER 136	104	4	.027	T D C	B.T.C.	Adv.	.252	A.T.C.	1 4 2-6-3-5	.007 .031	.006-.031	.020	.025
" 148	102	2	.023	B.T.C.	Adv.	.009		B.T.C.	1 5-3-6-2-4	.006-.010	.008-.012	.022	.030
" 158	102	2	.023	B.T.C.	Adv.		T D C		1-6 2-5 8-3-7-4	.006-.010	.008-.012	.022	.030
GRAHAM Std. 6	102	2	.012	B.T.C.	Adv.	T D C			1-6-2 5 8-3-7-4	.006-.010	.008-.012	.022	.030
" Special 6	102	2	.001	B.T.C.	Adv.	T D C			1 5-3-6 2-4	.006-.010	.008-.010	.018	.025
" Special 8	102	2	.011	B.T.C.	Adv.	T D C			1 5 3-6 2-4	.006-.010	.008-.010	.018	.025
" Custom 8	102	2	.009	B.T.C.	Adv.	T D C			1-6-2 5-8-3-7-4	.006-.010	.008-.010	.018	.025
HUDSON 8	104	2	.021*	B.T.C.	Set	.039	B.T.C.		1-6 2 5 8-3-7-4	.004-.010	.006-.010	.020	.022
HUI MOBILE Century 6	104	2	.018	B.T.C.	Adv.	.005	A.T.C.		1-5-3-6-2-4	.008-.010	.008-.010	.018	.025
" S	104	2	.018	B.T.C.	Adv.	.005	A.T.C.		1-5 3-6-2-4	.010-.008	.010-.008	.018	.025
" Century 8-L	104	2	.027	B.T.C.	Adv.	.002	A.T.C.		1-4-7-3 8 5-2-6	.007-.014	.010-.020	.020	.028
" C-H-U	104	2	.029	B.T.C.	Adv.	.036	A.T.C.		1-4 7-3-4-5-2-6	.007-.010	.014-.020	.020	.028
JORDAN 80	104	2	.081	B.T.C.	Adv.	.023	A.T.C.		1-6-2-5-8-3-7-4	.006-.012	.008-.012	.024	.030
" 90	104	2	.081	B.T.C.	Adv.	.023	A.T.C.		1-6-2-5-8-3-7-4	.006-.012	.008-.012	.024	.030
KISSEL 73	102	2	.036	A.T.C.	Ret.	T D C			1-5-3-6-2-4	.008	.008	.023	.030
" 95	102	2	.036	A.T.C.	Ret.	T D C			1-6-2-5-8-3-7-4	.008	.008	.023	.030
" 126	102	2	.034	A.T.C.	Ret.	T D C			1-6-2 5-8-3-7-4	.008	.008	.023	.030
LA SALLE 345	104	2	.025	B.T.C.	Adv.	.030	B.T.C.		{1L-4R-4L-2L {3R-3L-2R-1L	.004	.006	.020	.025
LINCOLN	102	2	5	.019	B.T.C.	Adv.	.190	B.T.C.	{1R-4L-2R-3L {4R-1L 3R-2L	.004	.004	.020	.028
MAIRMON 70	104	2	.018	B.T.C.	Adv.	.012	B.T.C.		1-6-2 5-8-3-7-4	.007-.010	.007-.010	.022	.025
" 88	104	2	.010	B.T.C.	Adv.	T D C			1-6-2-5-8-3-7-4	.008-.010	.008-.010	.022	.027
" 16	104	2	4		B.T.C.	Adv.	.011	B.T.C.	{R1-6-2-5-8-3-7-4 {L8-3-7-4-1-6-2-5	.008-.010	.008-.010	.022	.027
NASH 6 60	104	2	.008	B.T.C.	Set	.007	A.T.C.		1-5-3-6-2-4	.008	.008	.020	.020
" 8-70	104	2	.008	B.T.C.	Set	.007	A.T.C.		1-6-2-5-8-3-7-4	.008	.008	.020	.020
" 8-80	*113	37	.072	B.T.C.	Adv.	.072	A.T.C.		1-6-2-5-8-3-7-4	.012	.012	.025	.015
" 8-90	113	33	.077	B.T.C.	Adv.	.077	A.T.C.		1-6-2-5-8-3-7-4	.012	.012	.025	.020
OAKLAND 8	104	8	.018	B.T.C.	Set	T D C			1-4 5-2-7-6-3-8	.011	.013	.022	.025
OLDSMOBILE F31	104	2	.010*	B.T.C.	Set	T D C			1-5-3-6-2-4	.007-.010	.009-.010	.022	.025
PACKARD 826-833	102	2	.019	B.T.C.	Adv.	.151	B.T.C.		1-6-2-5-8-3-7-4	.0025-.004	.0045-.006	.015	.025
" 840-845	102	2	.019	B.T.C.	Adv.	.151	B.T.C.		1-6-2-5-8-3-7-4	.0025-.004	.0045-.006	.015	.025
PEARLESS Std. 8	104-103	2-12	.013	B.T.C.	Adv.	.023	A.T.C.		1-6-2-5-8-3-7-4	.007-.012	.007-.012	.022	.025
" Mst. Cst. 8	104-103	2-27	.016	B.T.C.	Adv.	.001	A.T.C.		1-6-2-5-8-3-7-4	.007-.012	.007-.012	.020	.025
PIERCE-ARROW 142, 144, 147	102	2	.030	B.T.C.	Adv.	.010	A.T.C.		1 6 2 5-8 3 7-4	.003-.001	.004-.006	.013	.027
" 137, 234	102	2	.026	B.T.C.	Adv.	.009	A.T.C.		1 6 2 5-8 3-7-4	.003-.004	.004-.006	.013	.027
PLYMOUTH	104-103	2-12	.050	B.T.C.	Adv.	T D C			1 3 4 2	.006-.008	.007-.009	.023	.027
PONTIAC	104	2	.005	B.T.C.	Set	.015	A.T.C.		1 5 3 6 2 4	.007-.010	.007-.010	.022	.022
REO 20-25	104	2	.035	B.T.C.	Adv.	T D C			1-5-3-6 2-4	.007-.012	.008-.012	.022	.025
" 30-35	104	2	.008	B.T.C.	Adv.	T D C			1-6-2 5-8-3-7-4	.008-.012	.008-.012	.020	.025
STUDEBAKER 6	102	2	.024	B.T.C.	Adv.	.008	A.T.C.		1-4 2-6 3-5	.001-.010	.006-.010	.020	.020
" Dict. 8	102	2	.016	B.T.C.	Adv.	.072	B.T.C.		1-6-2 5-8-3-7-4	.004-.010	.006-.010	.020	.025
" Com. 8	102	2	.023	B.T.C.	Adv.	.008	A.T.C.		1 6 2 5-8-3-7-4	.001-.010	.006-.010	.020	.025
" Pres. 8	102	2	.077	B.T.C.	Adv.	.017	A.T.C.		1 6 2 5-8-3-7-4	.004-.010	.006-.010	.020	.025
STUTZ LA	113	31	.077	B.T.C.	Adv.	.017	A.T.C.		1-5 3-6-2-4	.028-.032	.028-.032	.017	.017
" MA-MB	113	31	.077	B.T.C.	Adv.	.017	A.T.C.		1-6-2-5-8-3-7-4	.028-.032	.028-.032	.017	.022
" V32	104	8							1 6 2 5-8 3 7-4				
WHIPPET 98A	102	2	.023	B.T.C.	Adv.	.017	A.T.C.		1-5-3-6-2-4	.001-.003	.006-.009	.018	.025
WILLIAMS 98B-97-98D	104	2	T D C		Adv.	.018	B.T.C.		1-5 3-6-2-4	.004-.008	.006-.009	.018	.025
" 8-80, 8-80D	104	40	.014	B.T.C.	Adv.	T D C			1-6-2 5-8-3-7-4	.006-.010	.008-.010	.018	.025
WILLIAMS-KNIGHT 66B	100	6	.026	B.T.C.	Adv.	T D C			1-5 3-6-2-4			.018	.025
" 87	100	6	.026	B.T.C.	Adv.	.010	A.T.C.		1-5-3-6-2-4			.018	.025
" 66D	100	6	.026	B.T.C.	Adv.	.061	A.T.C.		1-5-3-6 2-4			.018	.025
WINDSOR 8-92	104	2	.023	T D C	Ret.	.023	A.T.C.		1 6 2-5-8-3-7-4	.004-.008	.006-.009	.022	.025

EXPLANATION OF ABBREVIATIONS

Adv.—Advanced Spark B.T.C.—Before Top Center H—Hot T.D.C.—Top Dead Center A.T.C.—After Top Center C—Cold Ret.—Retarded Spark

Note—On Valve Sleeve Engines "Exhaust Valve Closing" instead of "Intake Valve Opening" is given. See instructions for timing valves in Sleeve Motors

* Oldsmobile has given two settings .010 for straight run fuel and .025 for Ethyl or high compression fuel

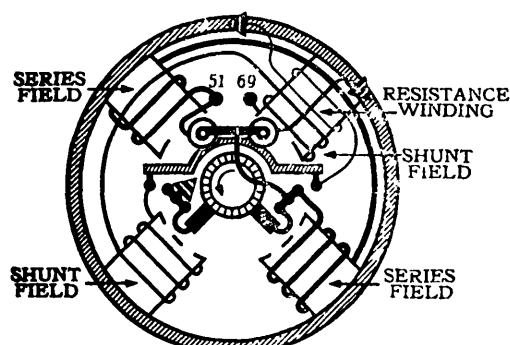
* Reo Royal 8 has given two settings .013 for straight run fuel and .048 for Ethyl or high compression.

* Nash 880 uses a 14 mm spark plug, special attachment No 150 for 113 adapter must be used

* Hudson Essex have given two settings for ignition timing: T.D.C. for straight run fuel on both cars, .041 B.T.C. for Essex and .021 B.T.C. for Hudson, when using Ethyl or high compression fuel

Robert Bosch No-Battery Generator Type K⁵⁰/₆500

This Generator was designed to meet lighting requirements on trucks and tractors which are not equipped with a battery. The lights operate directly from the generator, generator voltage being controlled by a highly perfected voltage regulator, which functions over the entire range of armature speeds.



SHUNT FIELD CIRCUIT TO GROUND COMPLETED THRU BRASS ARCH AND POINTS IN RIGHT HAND REGULATOR CYLINDER. SEE REGULATOR DIAGRAM FOR INTERNAL CIRCUITS.

FIG. 1.—Internal circuits (commutator end view) of the Robert Bosch No-Battery Generator, showing manner in which the field windings are placed on the four generator poles.

results in bridging the shunt field across the two main brushes. In actual practice, on a truck or tractor, this connection is made in the lighting switch. Terminal No. 51 (the armature) goes to the feed side of the lighting switch, after passing through a 10-ampere fuse, while terminal No. 69 (the shunt field) is connected to the light terminal on the lighting switch. The reason for connecting the unit in this manner is the desire to "kill" the generator when there is no lighting load. With the lighting switch in the "off" position, the shunt field circuit is broken and the generator cannot "build up" which, of course, relieves the unit of any strain, and prevents generator wear when it is not in use.

Regulation

Generator regulation is accomplished by means of two cylinders, both of which have voltage windings that actuate a floating rod or armature, one in each cylinder. The outside shell of the right hand regulator cylinder (commutator end view) makes contact with the brass supporting bridge (shown by cross hatching in Figure 1). To this brass bridge is connected one end of the shunt field, and also one end of the shunt field resistance. This cylinder has a voltage winding only (see Figure 3), the ends of which are bridged across the generator main brushes. Both Figures 2 and 3 show the circuits through this regulator cylinder.

The outside shell of the left hand regulator cylinder is insulated from the brass bridge. This cylinder not only has a voltage winding (connected in the same manner as the other regulator) but, in addition, has a current or series winding. The two windings are placed in this cylinder in such a way that they are accumulative, or assist one another. When the generator is not running, or running at very low speeds, the regulator contacts are in the positions as shown in Figures 2 and 3, and the generator circuit is as explained above. As speeds increase, and the generator voltage builds up,

contact "A," Figure 2, opens, which forces the shunt field current to flow through the field resistance winding to ground. As speeds are still further increased, and when the generator builds up to a pre-determined voltage, contacts "C" close (which "cuts out" or "shorts out" the series field). If generator speeds are still further increased and the voltage continues to rise, contact "B" will alternately open and close (or vibrate), which action momentarily cuts out the shunt field, and results in holding the generator voltage within bounds.

The following chart lists the regulator contact positions over the entire range of generator speeds:

Low Speed	Medium Speed	High Speed
Contacts—"A" Closed	Contacts—"A" Open,	Contacts—"A" Open,
"B" Open,	"B" Open,	"B" Vibrate,
"C" Open.	"C" Closed.	"C" Closed.

50

FIG. 3.—Internal circuits of Robert Bosch No-Battery Voltage Regulator, showing positions of contacts when generator is at rest, or operating at low speeds.

The Type K⁵⁰/₆500 Robert Bosch No-Battery Generator has a rated output of 50 watts. It is designed to operate two 21 candle-power head lights, two 3 candle-power side lights, and one each 3 candle-power dash and tail lights.

Provision is made for adjusting the regulator contacts; however, changes in their settings are not recommended because of the special tools and meters necessary to properly accomplish this work.

ROBERT BOSCH NO-BATTERY
GENERATOR TYPE K⁵⁰/₆500

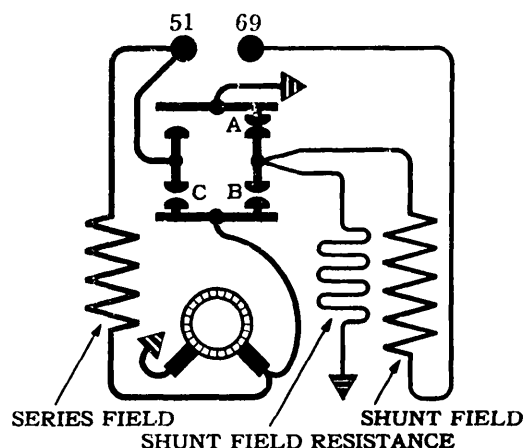


FIG. 2.—Schematic drawing of the Robert Bosch No-Battery Generator and Regulator Circuits, showing positions of contacts when generator is at rest, or operating at low speeds.

THE "STARTIX" AUTOMATIC STARTING SWITCH AND ANTI-STALL DEVICE

STANDARD EQUIPMENT ON AUBURN, SIX CYLINDER FRANKLIN, HUDSON, PIERCE-ARROW, ROCKNE, STUDEBAKER, and WILLYS 6-90A AUTOMOBILES. ALSO, ON 1932 DURANT, 1932 ESSEX, OPTIONAL ON 1933 REO, 1932 WILLYS 88-A, and 1933 WILLYS 99 AUTOMOBILES.

Description: "Startix" is an electrically operated starting switch, which requires but the turning of the ignition key to the "on" position to crank the engine. In addition, the "Startix" is an electrically operated anti-stall device, which automatically restarts the engine should the motor, for any reason, stop while the ignition switch is in the "on" position. Cars equipped with the "Startix" device do not require the use of the conventional foot starting switch, or the instrument board pull button, which units are entirely eliminated.

In addition to the cars mentioned above, on which "Startix" is standard equipment, it may also be used on other makes of cars, providing the starting motor engages the flywheel thru a Bendix or inertia type of drive. It cannot be adapted to cars using manually operated starting motor flywheel engagements. On cars equipped with lock ignition coils having but two primary coil terminals (Gardner 1928, Packard 1929), and cars equipped with the single terminal type Electrolock ignition switch (Auburn 1931, Ford Model "A"), a change in wiring is necessary if a "Startix" is to be installed.

What is inside the "Startix" Unit: Enclosed in the aluminum "Startix" box are found two electrically operated magnets, constructed on the solenoid principle. (A solenoid magnet is one which has its windings wound around a hollow tube. The magnetic action draws an iron rod up into the center of the tube.) Figure 1 is a view of a "Startix" unit after the back cover plate has been removed, while Figure 2 shows the circuits thru the windings on these two solenoid magnets, as well as the way in which they are connected.

IMPORTANT NOTE: While Figures 1 and 2 show the "Startix" unit in a vertical position, as a matter of fact, when the device is placed on the car it must be mounted on its side with the two small terminals "IGN" and "GEN" facing upwards.

Magnet No. 1 is controlled by the two separate windings "V" and "N" (Figure 2), which windings receive their current supply from two different sources, and are active at different times during the starting operation. This magnet operates the lever "L" which, in turn, closes and opens contact points "C". These points are in series with the windings on magnet No. 2.

Magnet No. 2 is controlled by the ignition switch, and operates (closes and opens) the heavy starting motor contacts.

How the "Startix" Device works: When the ignition switch is in the "off" position, and the engine is not running, the levers, contacts, etc., are in the positions as

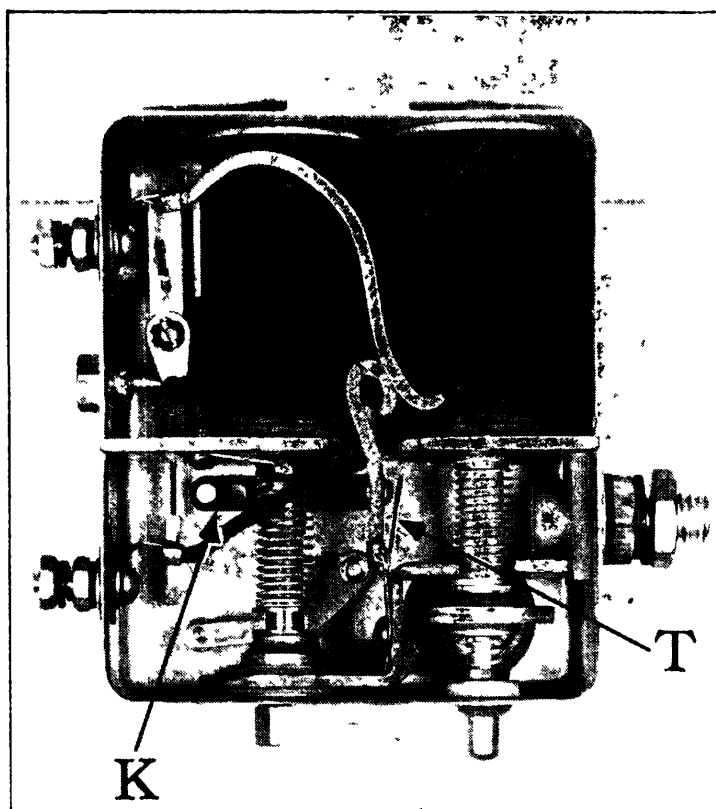


Figure 1.

Photograph of "Startix" Automatic Starting Switch after back cover plate has been removed.

shown in Figures 1 and 2. The small terminal stamped "IGN" (ignition), found on the side of the "Startix" box is connected to the "coil" side of the ignition switch. When the ignition switch is turned to the "on" position, not only will current flow to the ignition coil, but it will also flow down into the "Startix" unit, entering at the terminal "IGN", and follow along the white wire to the windings "I" on magnet No. 2, thence thru the black lead to contacts "C", thru points "C" to ground, and back to the battery. The magnetic action of the current flowing thru the windings "I" on magnet No. 2 will pull the heavy starting motor contacts "S" together and the engine will start to crank. With contacts "S" closed the heavy battery current entering the large terminal

stamped "BAT" (battery) can easily flow across to the other large terminal stamped "SM" (starting Motor), on its way to the starting motor.

By again referring to Figure 2 we will find a screw labeled "M" on the "SM" side of the starting switch. Under the head of this screw is attached a white lead, connected to winding "N" on magnet No. 1. Not only will battery current flow to the starting motor but, at the same time, some will follow up thru this white lead, thru the windings "N" on magnet No. 1, and to ground. This current thru winding "N", which flows only when the heavy starting contacts "S" are closed, partially magnetizes magnet No. 1, and has a tendency to draw lever "L" up; however, there is a counterforce holding the plunger of magnet No. 1 down, it being caused by the magnetic action of the single turn winding of the heavy starting motor lead around the core "R". As a matter of fact the winding "N" is sufficient to pull lever "L" all the way up, and open contacts "C", providing the current thru the single turn coil around core "R" is sufficiently small, such as is the case after the Bendix pinion gear de-meshes, and the starting motor is running "free", under no cranking load. Winding "V" becomes active when the engine starts, and the generator "builds up". One end of the voltage winding "V" on magnet No. 1 is connected by a red lead to the small terminal stamped "GEN" (generator), found on the side of the "Startix" device. The other end of winding "V" is grounded through a black lead. Terminal "GEN" is connected to the insulated main generator brush, and since the other generator main brush is grounded winding "V" is bridged directly across the generator brushes, which makes it a voltage winding.

Bear in mind that while the engine is cranking, and before it starts to run, magnet No. 1 is about half energized, the result of the current flowing thru winding "N". (We will later learn from the paragraph headed "How to test 'Startix' Units" that if the ends of winding "N" are connected directly across a 6 volt battery, with an ammeter in series with this circuit, the ammeter will register a current flow of slightly over three amps., and that a sharp "click" will be heard, which is caused by lever "L", as it is pulled up.) That this action does not take place when the engine is being cranked is due to the fact that there is a large voltage drop across the starting motor, affecting the value of the winding "N" and, besides, the cranking current thru the heavy, single turn coil around core "R" is such as to overbalance the affect of winding "N", and hold the plunger in the "down" position.

When the engine fires and the pinion gear is automatically disengaged, the current thru the single turn winding

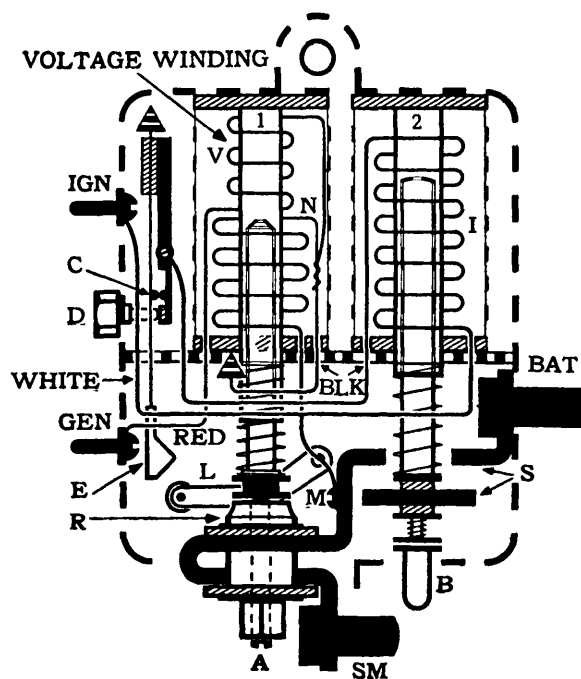


Figure 2.

Internal circuits of the "Startix" device. This diagram was developed with the unit in the same position as shown in Figure 1.

NOTE: The relative positions of all parts are accurately shown, with the exception of the large terminal stamped "SM". For the sake of clearness it is pictured to be at the end of the box, while, as a matter of fact, it actually is located on the front of the unit, or directly back of the heavy starting contacts "S", viewed as in Figure 1. The heavy turn around core "R" of necessity is shown as a spiral, while in reality it is a flat "U" shaped stamping.

ing "V" also assists winding "N" in over-balancing the effect of core "R".

around core "R" DECREASES, and the voltage applied to winding "N" INCREASES, causing winding "N" to over-balance the effect on core "R", and pull the lever "L" all the way up, thereby opening contacts "C". This means that the starting motor circuit is always opened immediately after the de-meshing of the Bendix gear, and results in less current draw from the battery because of this quick action. The moment the engine fires and continues to run, current generated by the generator causes winding "V" to become sufficiently active to hold lever "L" in the "up" position. The construction of winding "V" is such that a very small voltage and infinitesimal amperage is sufficient to hold up the plunger of magnet No. 1. Windings "V" and "N" are both placed on the magnet so that they are accumulative, or assist one another, and because of this, winding "V" also assists winding "N" in over-balancing the effect of core "R".

When contacts "C" open, the circuit thru the winding "I", on magnet No. 2, is "killed", and that magnet goes "dead", allowing the heavy starter contacts "S" to open. This action is assisted by a suitable coil compression spring, which is designed to have the proper tension. When the heavy starting contacts "S" open, current will no longer flow to either the starting motor, nor thru the winding "N" on magnet No. 1. Magnet No. 1, however, will still hold lever "L" in the "up" position, as long as the generator functions, even though it no longer is assisted by winding "N".

As long as the engine runs, and the generator generates, lever "L" will remain up, and contacts "C" will be held open. As a matter of interest, the current draw of this solenoid has no appreciable affect on the battery or charging rate, as the maximum current flow thru voltage winding "V" is but one-half ampere, or an amount less than that consumed by an ordinary, 3 candle-power dash or tail light bulb. The moment the engine stalls, however, and the generator no longer generates, voltage winding "V" will go "dead", and lever "L" will return to its original position, allowing contacts "C" to again close. When this happens winding "I" on coil No. 2 will again become active, and the whole starting action will be repeated, as explained above.

"Startix" incorporates a unique and most important feature in restarting of the engine. Just the right amount of time interval is automatically allowed between the stopping of the engine and the reclosing of the starting switch "S", to permit the starting motor and engine to come to a complete rest before restarting occurs. The time interval is controlled by the period of vibration of the arm assembly "E", which is released upon stopping of the engine. This vibra-

tion prevents current flowing thru contacts "C" until the arm comes to rest. This means that restarting is accomplished in a minimum of time, and with complete assurance of protection to the starter system. The time delay adjustment "D" is properly set and sealed at the factory, and under no circumstances should the adjustment be changed or the seal broken.

How the "Startix" protects system when Bendix gear jams in flywheel: It sometimes happens that a Bendix drive becomes jammed in the flywheel. On cars equipped with the conventional foot-operated, or pull type starting switch, a driver will quickly detect this condition, and take steps to rectify it. This is usually accomplished by turning the ignition "off", placing the transmission in high, and after releasing the brakes, pushing the car forwards and backwards until the Bendix gear snaps out of mesh. When this method does not prove effective it, of course, becomes necessary to remove the starting motor. On "Startix" equipped cars it is a little more difficult to readily detect this trouble, and because of the damage which surely would result to battery, starting contacts, as well as to the starting motor itself, were the heavy starting current allowed to flow indefinitely thru the locked starting motor, a thermostatically operated safety device is mounted in the "Startix" box, which acts as a protective device.

One end of a special bi-metal strip "T", Figure 1, is riveted to the "SM" side of the heavy starting switch contacts. To the other end of this thermostatic strip is attached a bakelite arm "K", Figure 1, which is so arranged that when it is moved in end it will force contact points "C" apart. Should the Bendix drive become jammed, with the resulting locking of the starting motor armature, the heat generated by the heavy current flow thru the starting contacts will affect the bi-metal strip, causing it to bend, thus moving the bakelite arm in end, which action, of course, opens contacts "C". This thermostatic action occurs in approximately a one-half minute interval. After the points are broken, the circuit is repeatedly opened and closed with a distinctive clicking sound, which warns the operator that the ignition should be turned "off". There is no readjustment necessary to the "Startix" box after the contributing difficulty has been corrected.

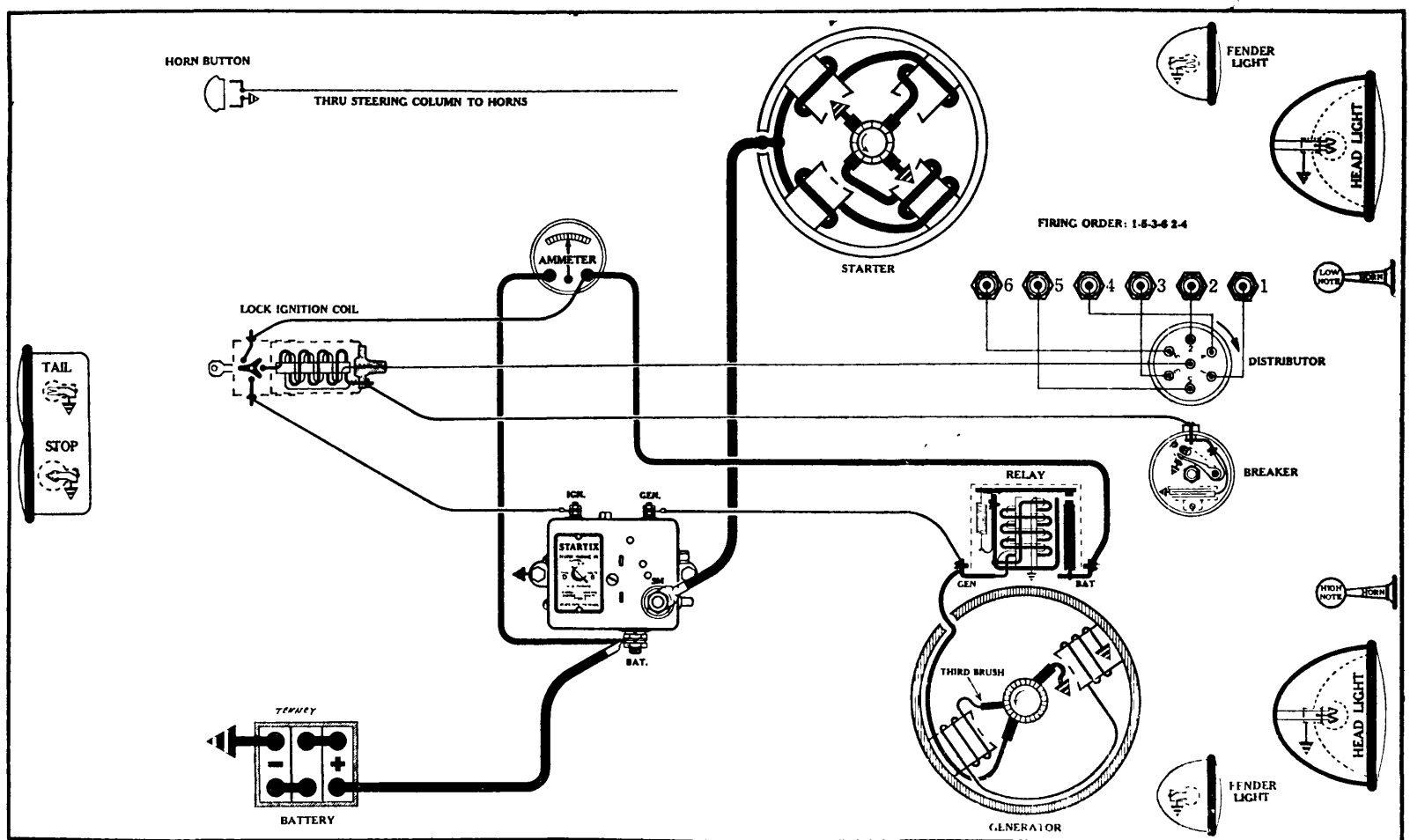


Figure 3.

Representative "Startix" wiring diagram, indicating correct method of connecting "Startix" to the various electrical units on the car

How to make "Startix" adjustments: Before making any adjustments to the unit, check all wires and connections to make sure that they are correct and tight. Bear in mind that the generator plays an important part in the "Startix" action, which means that it must be in perfect operating condition. It is, of course, needless to mention that the starting motor, as well as the battery and relay, must also be in good condition. If, after checking all the parts and units as suggested above, the device still does not operate satisfactorily, adjustments may be made according to the following instructions.

The time delay adjustment on the side of the "Startix" is properly set and sealed at the factory, and must not under any circumstances be changed. Resetting of the starting adjustment on the end of "Startix", see "A", Figure 2, may be found desirable on some cars, in view of the varying characteristics of generators and starting motors. Satisfactory performance of "Startix" depends largely on this adjustment, and it must be carefully made.

When adjusting "Startix" a special non-magnetic wrench and screw driver (as supplied by manufacturers) should be used. If ordinary steel wrenches or screw drivers are used for adjustment, they should (because of their magnetic effect) be removed after each adjustment.

When the adjustment screw is turned too far to the right, or inward, prolonged spinning of the starting motor results (called overrun or O. R.), and when turned too far to the left, or outward, interrupted cranking (called I.C.) or repeated attempts to crank at broken intervals is noted. Total movement of the adjustment screw between these two range limits is about ONE HALF TURN; therefore, the necessity for treating this adjustment as you would a carburetor adjustment is evident. It is desirable to first determine both of these range points, and then adjust the screw accordingly.

1. Before adjusting "Startix" first remove from distributor the high tension cable that connects distributor to the ignition coil and ground the end. This is necessary to prevent the following: engine starting, any possibility of backfiring, and injury to coil while determining the interrupted cranking position. Slightly loosen adjusting lock nut, and while the engine is being cranked determine position of interrupted cranking by turning screw SLOWLY to the left. At the point of interrupted cranking, slightly tighten nut, and make a small mark on the end of "Startix" in line with the screw slot. (If interrupted cranking is experienced before commencing adjustment, the screw should be turned SLOWLY to the right or inward, until steady cranking is obtained, and the mark made there.)

2. Connect the ignition coil wire to the distributor, so the engine can run. Remove the wire attached to the terminal on the "Startix" marked "GEN" and then turn screw SLOWLY about three-quarters turn to the right, or inward, keeping the lock nut fairly tight. Continual spinning of the starting motor after the engine has started will probably occur at this point. If not, turn screw slightly farther to the right and try again. (If starting motor spinning is experienced before commencing adjustment it will not be necessary to turn the screw to the right and, therefore, proceed as follows.) When a point of continued spinning has been found, do not turn off the ignition switch but leave the starting motor spinning, loosen lock nut and turn screw SLOWLY back to the LEFT, while the starting motor is spinning, until a click is heard, which indicates the opening of the starting switch, at which time the starting motor will begin to slow down. Lock the adjusting nut in this position. Check this setting by starting the engine. If the adjustment is correct, the starting motor should begin to slow down as soon as the engine starts. Mark this point similarly with a line coincident with the screw slot. Reconnect the generator wire at terminal on "Startix" marked "GEN".

3. **Final Setting.** Where the total range between the two points marked is one-half turn (180°), or less, make the final setting midway between these two points. If the total range is greater than one-half turn make the final setting one-quarter turn, or 90° from the "starting motor spinning" position. Be sure the adjustment is securely locked in this position. For future information leave the two range point marks on the "Startix".

What to do if generator goes dead while on the road: Should the generator fail while car is on the road, lever "L", Figure 2, will be released, and the starting switch will automatically close. The starting motor will operate, and the Bendix Drive will jump against the fast moving flywheel. A pronounced clicking sound will be heard, resulting from the contact between the starting motor pinion and the flywheel; however, no harm will result to the pinion or flywheel because of the automatic principle of the Bendix Drive. This condition may temporarily be overcome by disconnecting the wire attached to the small terminal stamped "IGN", found on the side of the "Startix" unit, and taping the end of the wire just removed.

How to start engine in emergency, or when "IGN" wire has been removed from "Startix" Device: The auxiliary starter button "B", Figure 2, is primarily intended to be used for cranking (ignition key "off"), or starting the engine when setting tappets or making other engine adjustments; but, if "Startix" should fail to operate when the ignition is turned "on", starting can be accomplished by using the auxiliary starter button. The method of operation is very important. Press the button HARD and UNTIL SOLIDLY BOTTOMED and RELEASE QUICKLY — let the finger slide off side of the button. Should the starting motor continue to spin after releasing the button, press it HARD again and release QUICKLY. When using the auxiliary starter button be sure the car is not in gear.

How to test electrical circuits thru the "Startix" Device : If any of the magnet windings are suspected of being open, or having closed coils, the following tests may easily be made with a six volt storage battery, and a low reading ammeter connected in series with the test leads, which tests will quickly show if trouble actually exists in the windings.

First. Remove the "Startix" unit from the car.

Second. To test circuits thru starting switch magnet (winding "I", Figure 2), connect one battery lead to small terminal stamped "IGN", and touch other lead to any part of the "Startix" box. The ammeter should register 1 ampere, and at the same time a sharp click should be heard, due to the closing of the heavy starting motor contacts. **IMPORTANT:** While these connections are still made, there should be a "dead short circuit" between the two large terminals stamped "BAT" and "SM".

Third. To test circuits thru voltage winding (winding "V", Figure 2), connect one battery lead to the small terminal stamped "GEN", and touch the other lead to any part of the "Startix" box. The ammeter should register $\frac{1}{2}$ ampere. No click should be heard.

Fourth. To test circuit thru current winding "N" (Figure 2), connect one battery lead to the large terminal stamped "SM", and touch the other lead to any part of the "Startix" box. The ammeter should register 3 amperes, and at the same time a sharp click should be heard, due to the pulling up of lever "L", Figure 2, and the opening of contact points "C". **IMPORTANT:** While these connections are still made another test should be made between small terminal stamped "IGN" and any part of the "Startix" box. At this moment there should be no circuit between terminal "IGN" and the outside of the box, as contacts "C" should be open.

In the event of failure, the manufacturers recommend that the "Startix" unit should not be removed from the car for service until the starting motor, generator and connections have been inspected, as previously outlined. However, in case "Startix" is positively found to be defective, it should be removed, care being taken not to break the seal on the time delay adjustment screw, nor to remove the cover from the "Startix". A new unit should be installed in its place, and the defective one returned to the factory, according to the regular routine.

Synchronizing Automobiles equipped with "Startix": Many mechanics prefer to synchronize high speed ignition distributors with the ignition "on", using the primary current in conjunction with a six volt test lamp, to indicate the opening and closing of the breaker points. If this procedure is to be followed on "Startix" equipped cars, employing a three terminal lock ignition coil (as shown in Figure 3), or a conventional three terminal Electrolock ignition switch, the wire attached to the small terminal stamped "IGN" must first be removed, and the end taped; otherwise, the engine will be continuously cranked when the ignition key is turned to the "on" position.

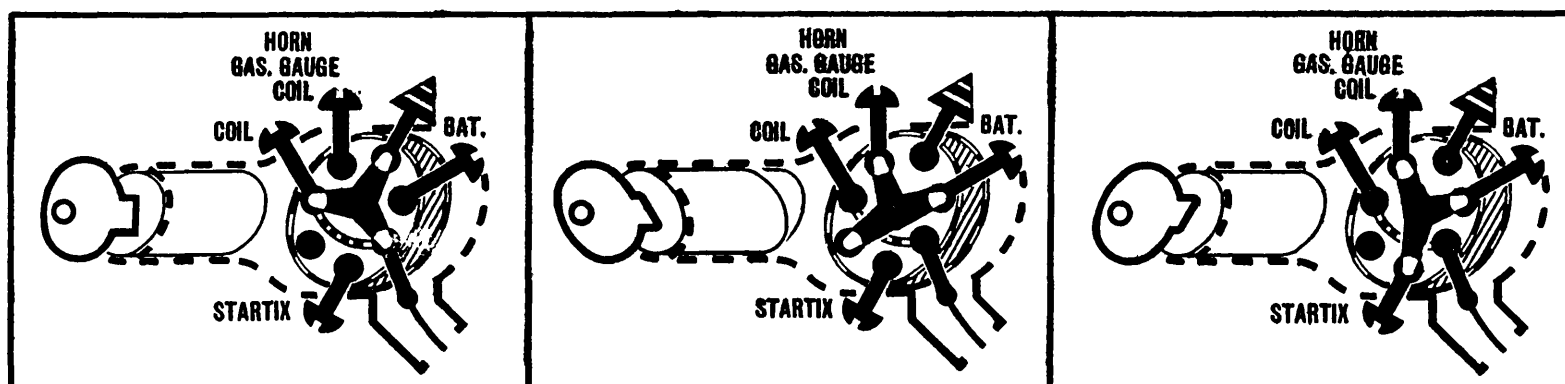


Figure 4.
Circuits thru type 15-S Electrolock Switch,
when in "off" position.

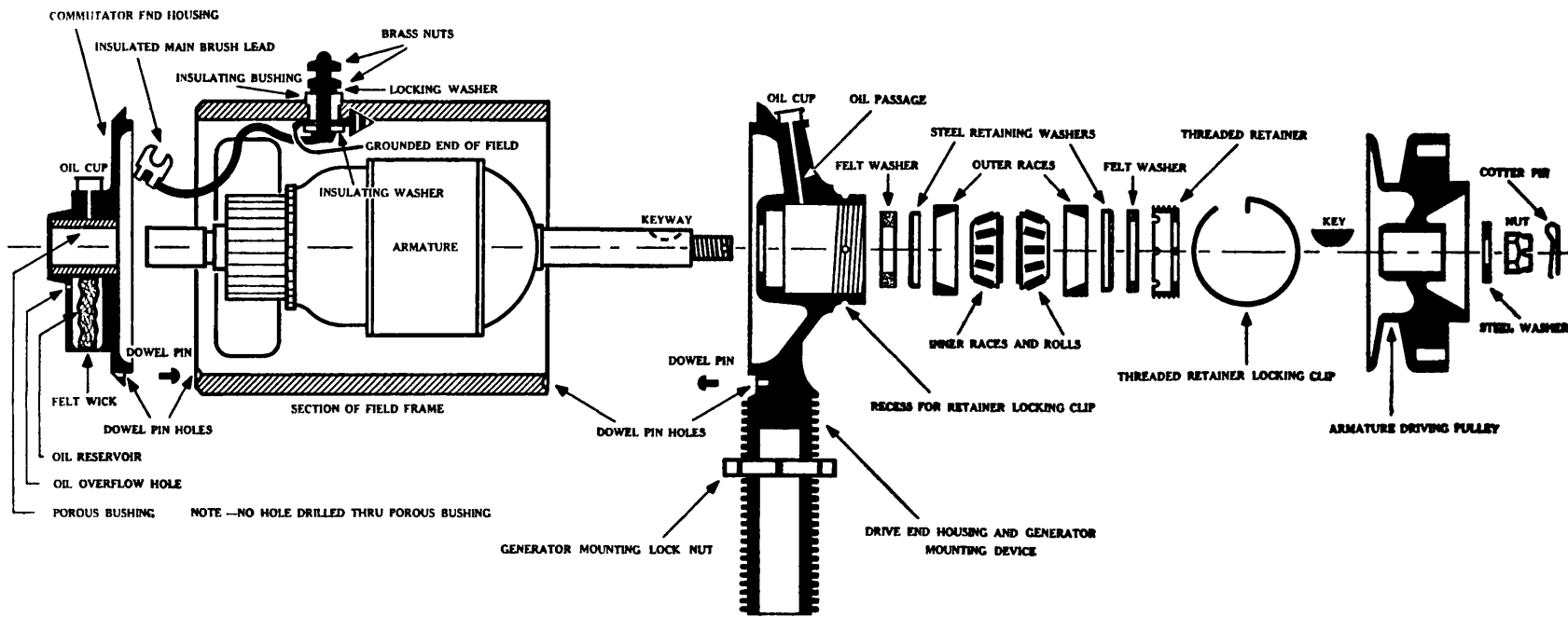
Figure 5.
Circuits thru type 15-S Electrolock Switch,
when in "emergency" position.

Figure 6.
Circuits thru type 15-S Electrolock Switch
when in "normal running" position.

The Type 15-S Electrolock developed for the 1932 Hudson and Essex Automobiles: To overcome the synchronizing difficulties mentioned, and to provide an emergency operating position in case of generator or "Startix" failure, while the car is on the road, a special four terminal Electrolock ignition switch has been developed. This new switch has three positions, the center or vertical key position being "off". When the ignition key is turned to the left (the emergency position), only the ignition, horn, gasoline, and oil gauge circuits are completed. In this position the "Startix" circuit remains "dead". When the ignition key is turned to the right (normal running position), all circuits are completed, including the "Startix" circuit. Figures 4, 5, and 6 show the internal circuits thru the new type 15-S Electrolock ignition switch, when the ignition key is turned to the various positions.

FORD "VEE" 8 GENERATORS

DETAILS OF ARMATURE AND BEARING ASSEMBLIES



In assembling the new Ford "Vee" 8 generators, extreme care must be exercised that the two dowel pins (one at each end of the generator field frame) are in place when the end housings are bolted into place. This is necessary because of the fact that the dowel pins are in the form of small rivets which are a loose fit in the dowel pin holes. Care also must be exercised when taking the unit apart, as these small pins are apt to drop out and become lost.

After all parts have been cleaned and repaired, lay them out on a clean piece of paper in the exact relative positions as shown above. Make sure that the **THREADED RETAINER LOCKING CLIP** is in place and that the bent end actually locks the **THREADED RETAINER** securely in position.

1932 FORD "VEE" 8 GENERATOR CHARACTERISTICS

Performance Data—Gen. cold.

Amps.	R.P.M	Volts
0	700	6.7
3	800	6.9
5	900	7.3
7	1000	7.4
9	1100	7.5
10	1200	7.6
10½	1300	7.7
10¾	1400	7.8
11	1500 (Max.)	7.9
11	1600	7.9
10½	1700	7.9

Motoring Freely—6 amps. at 6 volts.

Max. Stall Current—25 amps. at 5 volts.

Field Test—5¼ amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on main; 20 to 24 oz. on third.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

FORD "VEE" 8 MALLORY IGNITION

While Mallory Current Control Ignition Distributors have been available for considerable time, they were produced in the form of replacement units, and it remained for the Ford Motor Car Company to have the distinction of being the first car manufacturer to adopt this novel principle of breaker construction as original new car equipment.

Since 1926 electrical engineers have been working on special high speed ignition distributors which would meet the exacting demands made by the modern multi-cylinder high speed, high compression engines. Considerable effort was put into the perfecting of high speed distributors which employ a cam with half as many lobes as the engine has cylinders and two sets of breaker points connected in parallel, and operating alternately. This type of breaker construction fully meets all ignition requirements; however, there is the problem of synchronizing which is ever present when ignition timing is divided equally between two sets of breaker points.

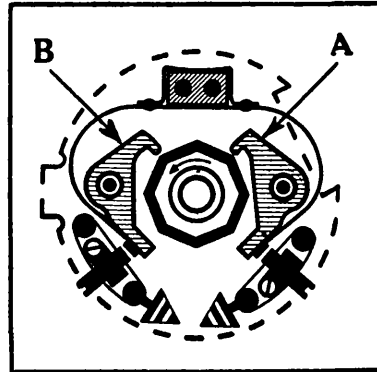


Fig. 1.

Internal circuits of Ford "Vee" 8 Breaker Mechanism.

interrupts the primary circuit, and therefore is the one which fires the engine, while the purpose of the other breaker assembly is to again close the primary circuit approximately 8 degrees of distributor shaft travel after the first set opens.

Figure 1 shows the new Ford-Mallory breaker plate assembly. Breaker arm "A", which opens last, controls the ignition, and fires the cylinders, while breaker arm "B" is so placed that each time it opens 10 degrees before arm "A", and closes 8 degrees after arm "A" opens. By using this construction the primary circuit is interrupted thru only 8 degrees of distributor shaft travel and, therefore, this distributor has an effective coil saturation period of approximately 37 degrees of distributor shaft travel, during which time the primary winding may become energized.

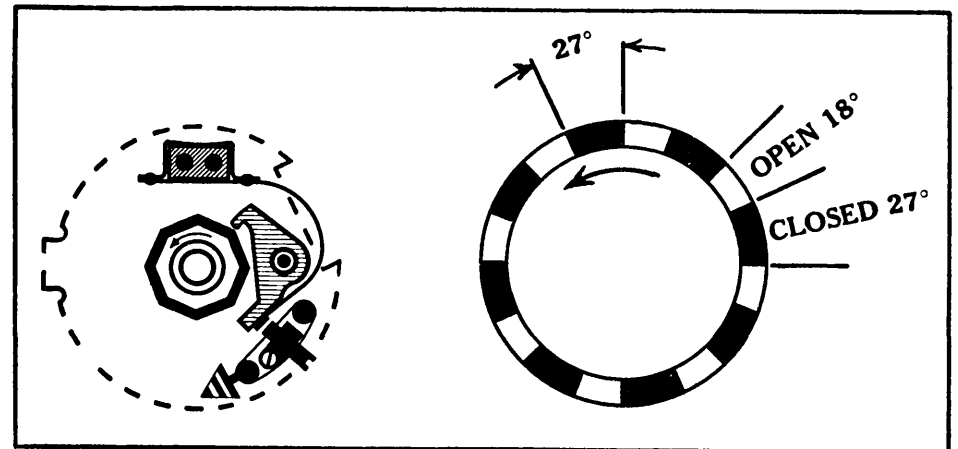


Fig. 2.

Graphic representation of intervals the primary circuit would be open and closed during one turn of the cam, were the distributor built with but one breaker assembly.

To better understand this distributor action let us refer to Figure 2, which graphically shows the intervals the primary circuit would be open and closed were the Ford-Mallory distributor constructed with but one breaker arm assembly and an eight lobed cam. In this diagram the solid black sections represent the intervals in degrees during which the primary circuit is closed, while the white sections are the intervals during which the breaker points are open and the primary circuit broken. From this diagram it will be seen that it requires 18 degrees of cam travel between the time the points open and again close. As the eight cam lobes are spaced every 45 degrees apart it leaves but 45 minus 18, or 27 degrees, during which the coil can build up. This interval is not sufficient to properly energize the coil, especially when the engine is operating at high speeds.

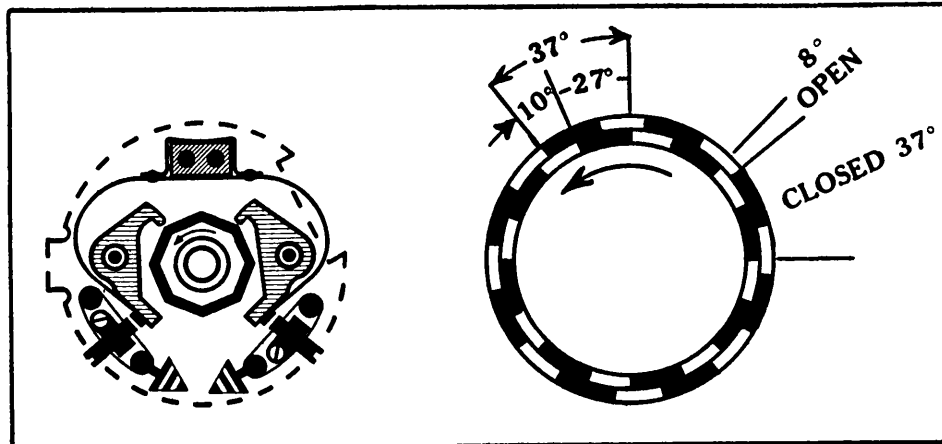


Fig. 3.

Graphic representation of intervals in which the primary circuit is open and closed during one turn of the cam on the Ford "Vee" 8 Distributor.

Figure 3 shows how this short 27 degree interval is lengthened out by the action of the second set of breaker points. This is accomplished by overlapping the second breaker assembly, so that its points close 8 degrees after the first set opens. This, in reality, lengthens the original 27 degree interval by 10 degrees more.

In practice it will be found that breaker assembly "A", Figure 1, will show the conventional points pitting or burning, as they are the ones which break the primary circuit. Point assembly "B", however, is not called upon, at any time, to break the primary circuit, and consequently will not pit or burn.

The proper adjusting of the breaker contact separation on both sets of points is very important. The recommended point separation is but .012 inch. No other breaker plate adjustments are possible, as the mechanism was carefully designed, and it is not necessary to change the relative position of the two breaker arms.

UNITED AMERICAN BOSCH MAGNETO TYPE JRD-6

Induction Type - With Combination Magneto and Battery Distributor.

This new heavy duty Bosch Magneto was developed to meet the requirements of commercial buses and trucks, where positive and unfailing ignition is imperative

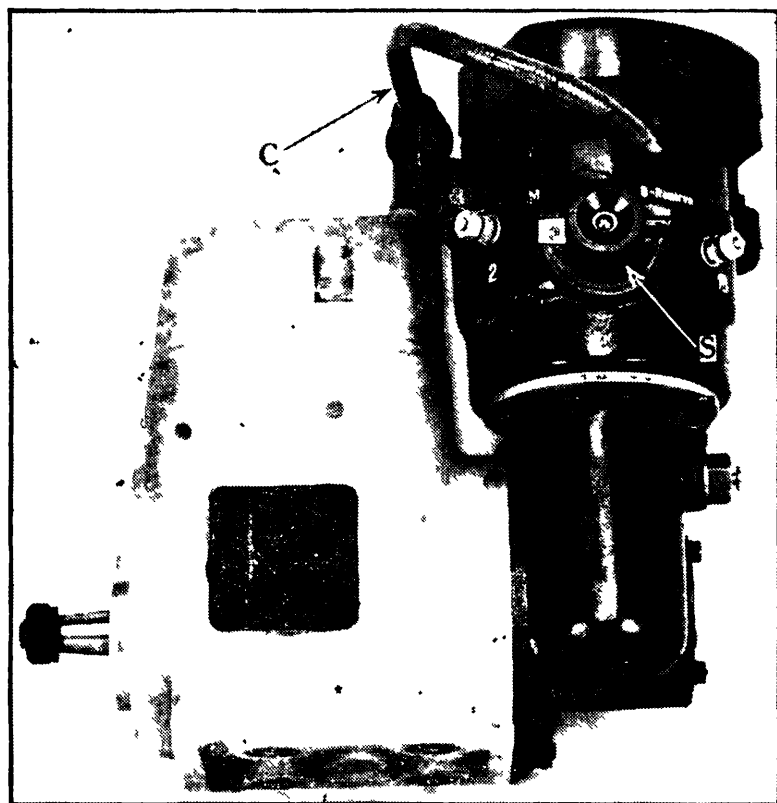
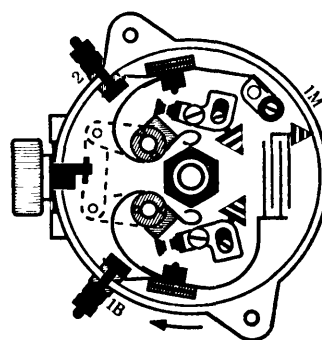


Fig. 1

Figure 1 shows the side view of this new type magneto with the knurled device for changing the breaker mechanism from magneto to battery ignition.

Figure 2 shows the breaker mechanism and the system of linkages which holds either the magneto or battery breaker arm assembly in an inactive position, depending upon which type of ignition is in use. When emergency battery ignition is desired the short high tension cable, labeled "C", Figure 1, is removed from the socket on top of the magneto, and inserted in the high tension terminal of the emergency ignition coil. The knurled knob "K" is turned to the "B-Reserve" side, and the change-over is completed.



BOSCH MAGNETO TYPE JRD6

Fig. 2

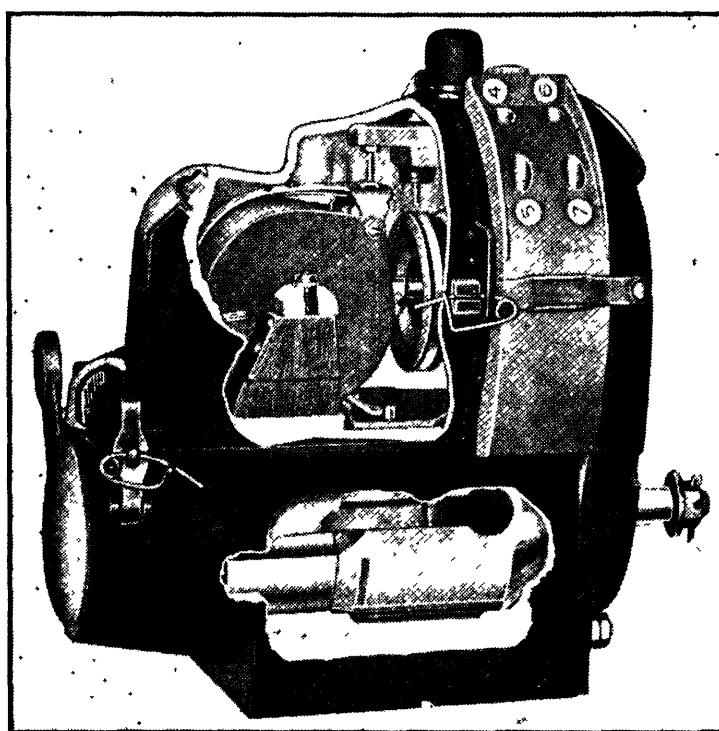
GENERAL CHARACTERISTICS OF THE SCINTILLA AIRCRAFT MAGNETO

Instead of the conventional horse shoe magnets, one bell shaped magnet is used, the rotation of which produces a reversal of magnetic flux through the core of the coil.

A brass end plate is fastened to the laminated pole extremities of the rotating magnet. This plate carries the inner race for rear end ball bearing and the breaker cam.

The condenser is incorporated within the stationary coil and is located between the primary and secondary winding.

The contact breaker mechanism is held in position by a bayonet lock and can be completely removed, by hand, without the use of any tools.



INSPECTION

Magneto Housing:

The breaker stop and the safety gap ground plate must be tight and their fastening screws locked. Have $\frac{3}{8}$ cap screw hold down holes clean and threads straight. Lap base just enough to see that its surface is smooth. It is imperative that the oil lead to back bearing be open and clean. Flush with a good grade of light oil after cleaning.

Front End Plate:

Lift oil wick and spring out of distributor gear axle. Clean oil leads to axle and front end bearing and flush with a good grade of light oil. Replace oil wick in distributor gear axle. See that fastening screws for distributor gear axle are tight and locked to the outside surface of the front end plate.

Examine large distributor gear to see that there are no burrs on teeth of gear. Replace gear, taking care to hold wick down until covered by gear bearing. Replace spacing washers and spring ring. Try end play of gear on shaft. If not less than .005 inch or more than .008 inch, it is satisfactory. Test dog screw. It must be tight and locked to the large distributor gear.

Replace paper spacing washer and distributor cylinder. Replace spring ring. Total thickness of spacing washer should be such that distributor cylinder will be held tightly against distributor gear. Force spring ring into its groove throughout its length.

Breaker Assembly:

Replace end cover with advance lever on breaker assembly. Place assembly in position in magneto housing and note that it functions as follows:

The bayonet lock latch, when released, should snap into position and the breaker will spring over to full advance. Remove breaker and lay aside for adjustment during final assembly.

Main Cover:

Clean oil lead to back bearing thoroughly. Examine booster and ground connection block in top of main cover, especially around the terminal marked "H," as any small cracks in the material would ground the booster current.

Coil:

Note that secondary brush holder is solid with the coil. It is of vital importance that the spring contacts on the primary bridge be in good condition. The rear spring bears against the face of the insulated support on top of the breaker cage, while the front spring located above the coil, makes contact with the ground contact stud.

Distributor Blocks:

Examine electrodes. Be sure that they are screwed tight into the distributor block. Loose number discs must be glued with a water and oil proof glue. After glue is dry, apply white shellac as an added precaution.

Rotating Magnet Assembly:

Check cam fastening screw. Note condition of ball bearings. It will be noticed that the cage and balls of the front bearing are a loose part on the AG 12-D rotating magnet, while on the AG 8-D and AG 9-D rotating magnets they stay on the inner race. This allows the balls to clear the large distributor gear during the assembly of the AG 12-D. All types of rotating magnets carry the cage and balls for the rear bearing on the inner race.

Examine laminated pole end of magnet for any signs of rubbing due to foreign material lodging between laminated ends of magnet and pole shoes. The clearance between laminated poles and pole shoes is .002 of an inch. This explains the necessity of keeping them clean and free from any foreign material.

FINAL ASSEMBLY

It is presumed that as near as possible the mechanic will use the original parts of the magneto for the re-assembly.

While Scintilla parts are readily interchangeable in each type of magneto and for a given rotation will function in another magneto of the same rotation, much time and effort will be saved by using the same rotating magnet, magneto housing and front end plate in the re-assembly.

The end play and bearing fit of the rotor in the magneto in most instances will be found correct.

The rotating magnet was taken as the last sub-assembly for inspection so that while it was cleaned up it could be installed in the magneto housing immediately.

- (1) Have magneto housing clean and ready to receive rotating magnet.
- (2) Take up the rotating magnet and fill the rear ball cage with good grease. Grease magnet all over, leaving a film of grease to prevent rust.
- (3) Recharge rotating magnet, clean off metal particles that may be adhering to poles and place in housing at once.
The magnet is easily replaced by turning it until a flat surface is at the top, then push in place. Now turn rotating magnet right or left 45° or until the space between the top of the pole shoes is filled by one of the poles of the magnet. This is the neutral position for the rotating magnet and it should always be left in this position unless there is a keeper across the pole shoe extensions.
- (4) Fill cage and ball assembly for front bearing with grease mentioned above, put it on over the shaft and place it on the inner race. NOTE: If the magneto is an AG 12-D the cage and ball assembly must be placed in outer race in front end plate and assembled with it.
- (5) Observe the arrow on top of the main cover to find direction of rotation for which internal timing was originally set. If arrow points anti-clockwise, as viewed from the drive end of the magnet, match all timing marks "G". If

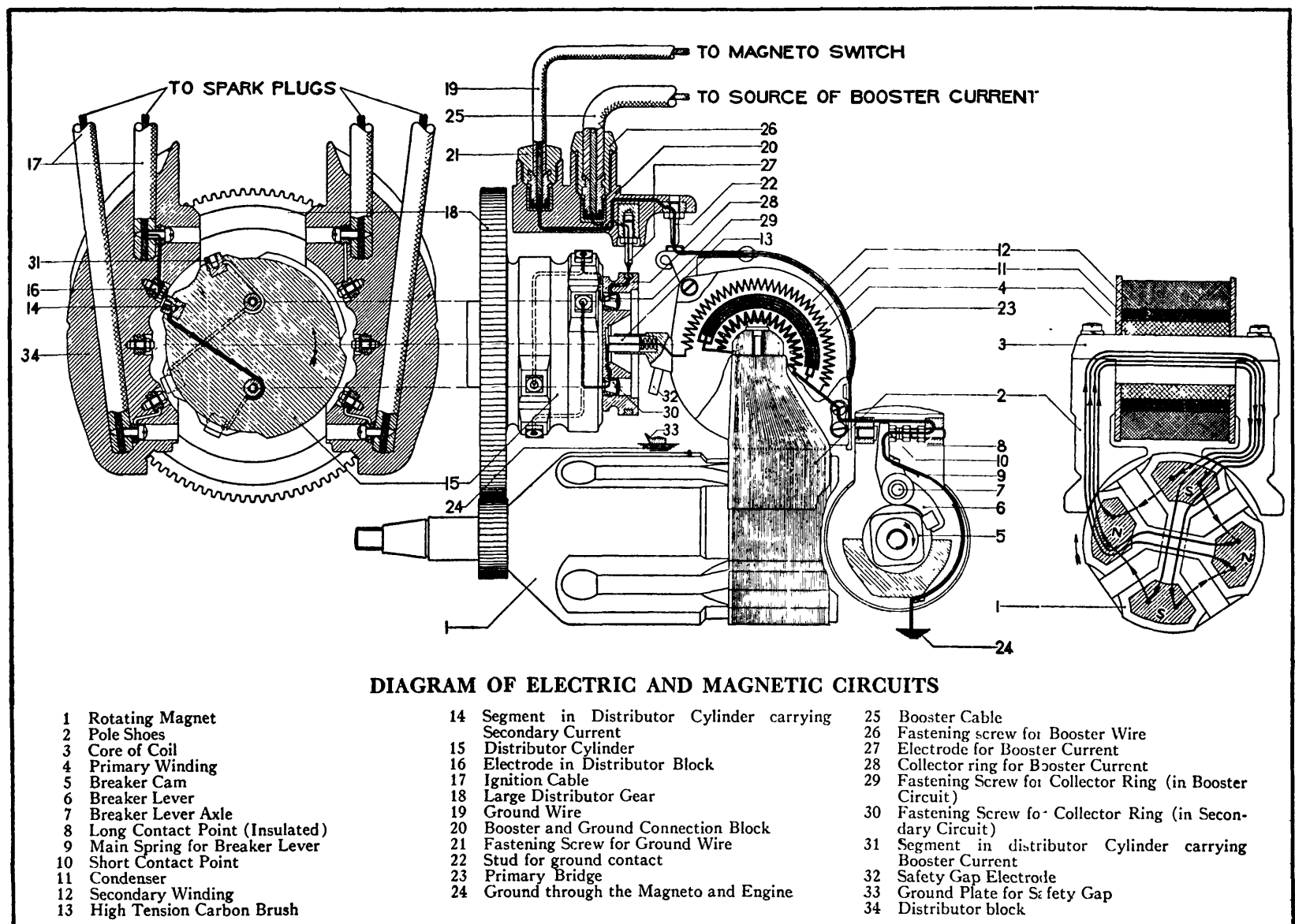
arrow points clockwise, match all timing marks "D." Suppose the magneto to be assembled is an anti-clockwise or left hand rotation:

- (6) Turn rotating magnet until the marked tooth on back of small distributor gear is up in view so that it may be matched with the marked tooth on the large distributor gear.
- (7) Take up front end plate and put in on over drive end shaft until edges of gears are about to touch, holding the plate in one hand and guide the mark on the large distributor gear by turning the distributor cylinder with the other hand. When the marked tooth on the small gear and the marked tooth on the large distributor gear are matched, push the front end plate up against the magneto housing and secure by means of the two screws and studs provided.
- (8) Test rotating magnet for end play. There should be none. The bearings should be just tight enough that when the magnet is turned about 30 degrees from the neutral position it will be returned to the neutral position by the magnetic pull.
- (9) Replace breaker assembly for final setting. Set contacts points so that their maximum opening will be .012 of an inch. The small gauge on the Scintilla contact point wrench may be used for this purpose.

When contact points are set at .012 for maximum opening the clearance between back of breaker arm and face of fibre stop should be from .002 to .010 of an inch.

Check clearance on each cam lobe. The cam must run true within 0.0005 of an inch.

- (10) The internal timing of the magneto must now be checked. Turn rotating magnet until Figure 1 on large distributor gear is in line with the mark in the timing window; the supplemental timing marks, located on inside edges of large distributor gear and the front end plate, should also be in line at this time.



By slowly rocking rotating magnet with the breaker in full advance position, the points should be just on the instant of opening as Number 1 and its mark and the supplemental timing marks come in line with each other. Hold rotating magnet with timing marks in line and with one hand place the right distributor block in position. When magneto is correctly timed, the Number 1 electrode will coincide with a segment on the distributor cylinder.

- (11) Remove breaker assembly; this permits an easier installation of the coil.
- (12) Place coil between pole shoe extremities. This is best accomplished by sliding coil in from the back and moving it forward into position. The coil fits tight and often causes the pole shoe extensions to shear off a very thin piece of the fibre side plate. Take every precaution that none of this fibre gets in between the ends of the core of the coil and the ends of the pole shoe extensions. Secure coil with a fastening screw in each end of the core.
- (13) Replace breaker assembly. Spin magneto; if properly assembled and timed a good snappy blue spark will jump across the safety gap. The safety gap should be not less than $\frac{3}{8}$ or more than $\frac{1}{2}$ of an inch.
- (14) Put main cover in place. Take great care that it fits housing. Have bottom edges of main cover smooth. It is important that cover fits housing accurately since the top extension of cover acts as a stop for the distributor blocks while the housing supports them at their lower end. Any serious mis-alignment would result in injury to electrodes in the distributor blocks and segments in the distributor cylinder. Fasten main cover to housing with two long screws provided.
- (15) Replace breaker cover. Fasten spring clamps and safety.
- (16) Replace distributor blocks. Match them up with the number discs on the sides of the top of the main cover. Fasten distributor block spring clamps in place and safety.

This completes the final assembly.

1932 DELCO-REMY HIGH SPEED IGNITION DISTRIBUTORS TYPE 661-C, D, F, G, J.

USED ON CHRYSLER, DODGE, GRAHAM, AND PONTIAC
8 CYLINDER AUTOMOBILES

This is a new type Delco-Remy distributor which employs an **Eight Lobe Cam** and but a **Single** breaker assembly for eight cylinder ignition. It will be recalled that in 1931 the 661-B distributor was developed for use on the Oakland "Vee" 8; however, this unit, while operating with an eight point cam, employed two sets of breaker points which opened simultaneously.

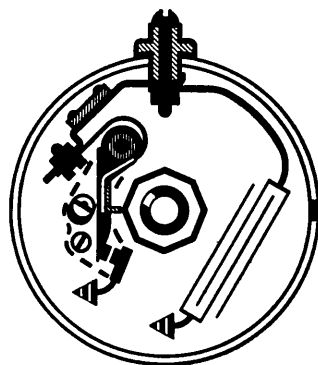


Fig. 1

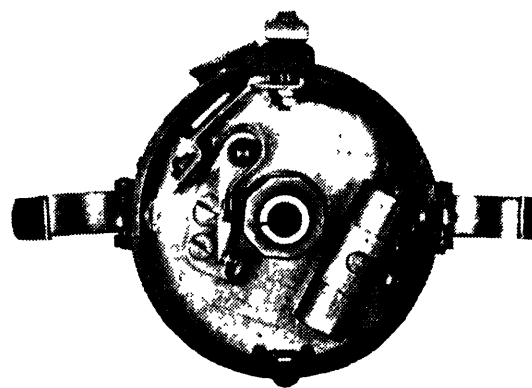


Fig. 2

While these new distributors do not require synchronizing, it is imperative that extreme care be exercised in lining up and adjusting the breaker point contact separation. The construction of the movable breaker arm differs radically from any previously used. The arm is much lighter, the contact spring tension is slightly greater and the breaker contact separation should be adjusted to a gap of but .014 inch, or the points should be separated thru but 16 distributor shaft degrees, if this adjustment is made in a **distributor test fixture**.

OWEN-DYNETO

COMBINATION CHARGE REGULATOR AND CUT-OUT RELAY

Standard equipment on all Packards since 1930, and Hupmobile, Series 226, 1932. This device is manufactured by the Owen-Dyneto Corporation of Syracuse, N. Y., and is built in various forms which easily may be adapted to all makes and models of generators now in general pleasure car use.

The use of this simple device eliminates all possibilities of ruining batteries through overcharging and, at the same time, reduces burned out lighting bulbs to a minimum. These results are accomplished by employing a voltage-controlled thermostat, which "cuts in" or "cuts out" generator field resistance, in conjunction with the conventional type third brush regulated generator.

The Owen-Dyneto charge regulators differ from other thermostatic field controls in that they actually depend upon the variations in line voltages in order for them to function. To better understand this difference let us, for the moment, consider the well known and very popular Delco-Remy generator field control thermostat, with which every auto-electrician is familiar. This device depends upon the rise in generator temperature, as it heats up under load, to cause it to function. When a Delco-Remy generator heats up to a temperature of, roughly, 185 degrees Fahrenheit, the field control thermostat will open and automatically cut field resistance in series with the shunt field circuit.

Now, as an extreme example, were this same generator to be placed in some part of the world where the outside temperature were 185 degrees, the thermostat would open from the heat of the sun, regardless of whether the generator were in operation or not, or whether the battery were discharged or charged. This would not be the case with an Owen-Dyneto charge regulator, because of the fact that the thermostatic bars are so designed that they compensate for outside temperatures, and it is only the heat resulting from an excess of current in the voltage winding about one of the thermostatic bars which will cause it to operate.

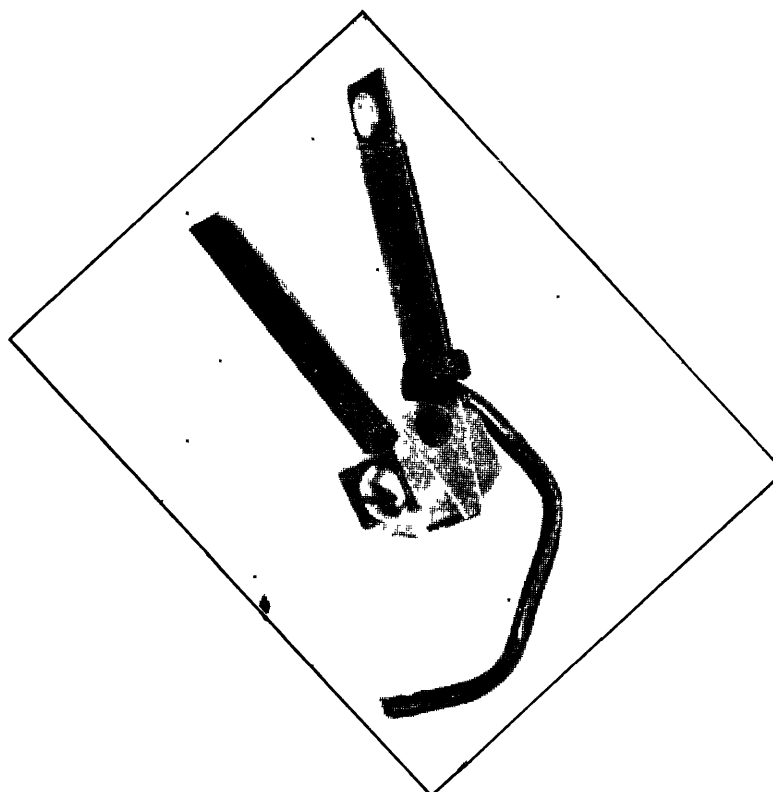


Fig. 1.

Figure 1 shows the compensating thermostat with the fine voltage winding wound around the upper leg, which also carries a contact point at the extreme outer end. This assembly is supported on a stud, and is free to move about the stud as a center. Both legs of this unit are thermostatic bars, both designed to curl in an upward direction when subjected to heat.

By referring to Figure 2 it will be seen that the lower leg of the thermostat assembly is supported by adjusting screw "S". A spring shown in Figure 2 holds this lower leg down against screw "S", which action, of course, causes contact points "P" to come firmly together. Raising or lowering adjusting screw "S" will decrease or increase the pressure between the regulator points which, of course, controls the sensitivity of the regulator action. Because of the fact that an increase in room temperature will effect both legs of the thermostat in an equal amount, any tendency for the upper leg to curl "up", thus relieving the tension between regulator points "P", will be compensated for by a like amount of curling up of the lower thermostatic leg. From this explanation it should be evident that, regardless of outside temperatures, the pressure between regulator points will always be the same.

The actual regulating action is very simple to understand. As with all voltage type regulators, the voltage winding will be found connected directly across the two main brushes. With this regulator the voltage winding is in the form of a heating unit wound around the upper leg of the thermostatic assembly (winding "H", Figure 2). One end of this

winding is grounded to the thermostatic bar which, of course, means that that end is connected to the grounded main brush. The insulated end of the winding is attached to the insulated main brush at point "C" on the relay frame. Any rise in main brush voltage will result in an additional amount of current being forced through this voltage winding which, in turn, will cause the winding to heat and operate the upper leg of the thermostat.

Ordinarily, or until such time as the generator brush voltage becomes too high, contact points "P" (Figure 2), are closed. When these contacts are closed the shunt field is completed through these points to ground, the field circuit being from the upper right-hand generator pole to terminal "A" on the plate which carries the lower contact point, through the upper point to the upper thermostatic bar, which is grounded through the field fuse. When the line voltage increases sufficiently to open contact points "P" (as explained above), the field circuit is compelled to pass through field resistance "R" which, of course, results in a reduced charging rate, with a corresponding drop in the line voltage.

The early Owen-Dyneto charge regulators were equipped with resistance wire, field resistance units. This form of resistance has been replaced by a special carbon resistance block; however, the regulating action is the same.

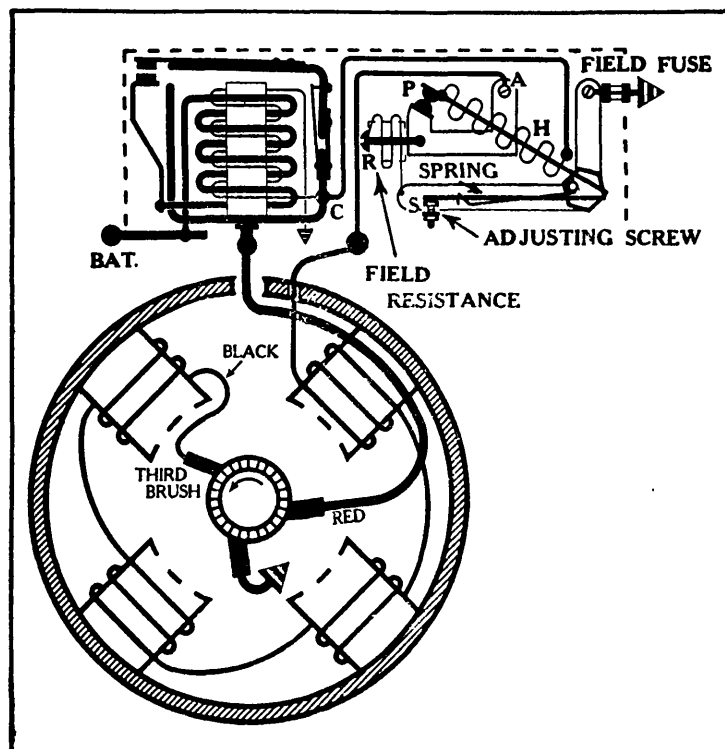


Fig. 2.

ADJUSTMENT TO OBTAIN CORRECT SETTING

1. Check gravity of battery, and if low, replace by full battery while Regulator is being adjusted. Do not attempt to adjust the Regulator on a low battery.
2. Connect voltmeter from battery terminal on Battery Charge Regulator to ground.
3. Start the engine of the car and allow it to idle until thoroughly warmed up. Then set the throttle to obtain the maximum output of the generator, and allow the engine to run at this speed until the Regulator operates, providing it does so at 8 volts or less. Note the voltage at which the unit operates, and the amperage to which the charging rate drops after the Regulator has operated.
4. If the Regulator fails to operate between 7.6 to 8 volts, shut off the engine, and remove the fuse holder and fuse from Regulator cover, and then the cover from the Regulator. Proceed to correct the setting by turning the adjusting screw "S", Figure 2, to the left to decrease the voltage at which the points will open, or to the right to increase it.
5. Replace the cover on the Regulator; tighten the cover screws. Replace the fuse holder and fuse on Regulator, and start the engine to repeat the test, as before. Two or three such tests should be sufficient to secure the proper setting.
6. As a final check, to see that the Regulator is properly adjusted, run the engine for five minutes at a speed sufficient to keep the voltage at 7.2 to 7.3 volts. If the Regulator does not operate during this time, the setting may be pronounced correct.

When the Regulator operates, the charging rate should drop to approximately half of its original value. Adjustment to the charging rate can be made by means of the carbon resistance spool in the Regulator. Tighten down on the resistance spool, attaching screw to increase the rate, or loosening it to decrease the rate. The lock nut on this screw should be tightened after each adjustment.

If the Regulator is not equipped with the new type carbon resistance spool, and it is desired to adjust to a lower charging rate, the old type wire-wound spool must be replaced by a carbon spool before any adjustment can be made.

1932-33 CADILLAC "SUPER-SAFE" HEAD LIGHTS

A new headlight system, called "Super-Safe", is used on all 1932 Cadillac automobiles. This system actually comprises two independent lighting systems, one for the right-hand, and one for the left-hand lamp. The lamps are made so that neither the doors, lenses, or reflectors can be interchanged.

The basis of the "Super-Safe" lighting system is the new Mazda No. 3001, three filament 32-21-21 candle-power bulb (see Figure 1), developed for Cadillac use. These triple filament bulbs, in conjunction with reflectors and special lenses (which are different in the two head lamps), give four lighting combinations, two for city driving and two for country driving. The advantage of this new system is increased, and better distributed, illumination for country driving.

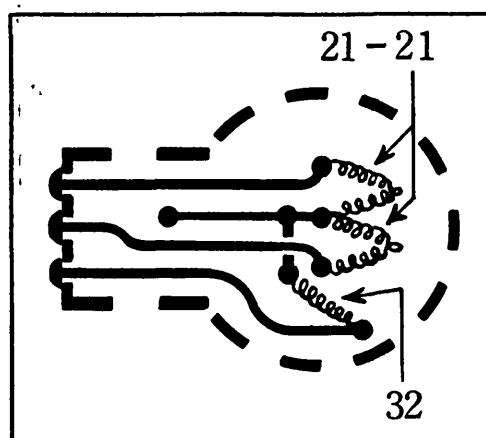


Fig. 1.

Internal circuits through the special Mazda #3001 Bulb.

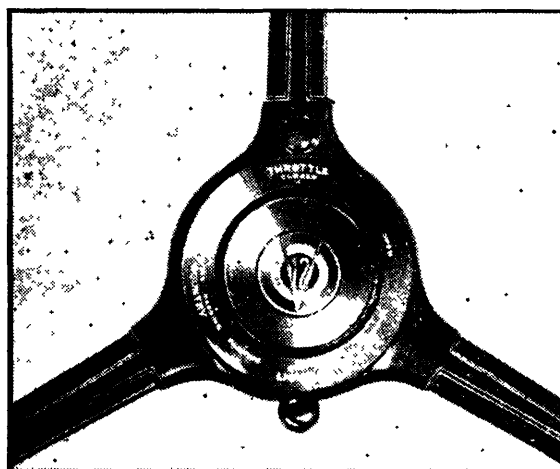


Fig. 2.

The 1932 Cadillac Steering Wheel Lighting Switch Control.

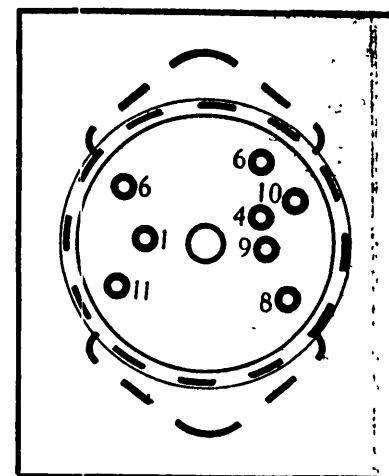


Fig. 3.

The six position Cadillac Lighting Switch used with Super-Safe Lighting system.

The lens on the left-hand head lamp deflects light toward the right side of the road, while the right lens spreads the light uniformly over the road in front of the car. The bulb in the left head lamp is installed with the 32 C.P. filament AT THE TOP, while the bulb in the right lamp is installed with the 32 C.P. filament AT THE BOTTOM. The slots in the sockets are so placed that it is impossible to insert the bulbs other than in their correct position.

The head lamps are wired so as to give four lighting combinations:

1. City passing.
2. City driving.
3. Country passing.
4. Country driving.

These combinations are controlled by the lever on the steering wheel, see Figure 2, which operates the special Delco-Remy 486-S lighting switch located at foot of steering column. This new lighting switch, see Figure 3, is a six position switch, and, in addition to the four lighting positions, it has a "park" and "off" position.

The filaments which are used, and the beams which they produce to give the various lighting combinations, are shown in Figure 4. For "city passing" both head lamps produce a beam which is tilted sharply downwards, resulting in no glare, but clearly visible. When in the "city driving" position, both head lamps produce a beam of moderate tilt, plainly illuminating dark streets, but complying with all regulations.

In the "country passing" position, the left head lamp with two filaments lighted (totaling 53 C.P.), gives intense illumination of the right side of the road and gutter, close in front of the car. This clearly illuminates any ditches or obstacles, while the right head lamp produces a moderate tilted non-glaring beam straight ahead. For "country driving" the left head lamp produces normal illumination, moderately tilted, while the right head light, with two filaments, lighted (totaling 53 C.P.), illuminates the road far ahead.

This combination of lights results in more and better placed illumination than is possible with the conventional type head lamps, even though 32 C.P. bifocal bulbs are used. The laws of some states (Massachusetts is one) prohibit the direct light above the horizontal. To comply with such laws the connections at the right head lamp must be changed to prevent the operation of the 32 C.P. filament. This is done by removing the right head lamp, and insulating the tip of wire No. 3 in the plug. This wire is black with a red tracer, and has the tip with shortest shank.

There are no focusing or other adjustments within the head lamps themselves. The only adjustment required is the aiming of the lamp.

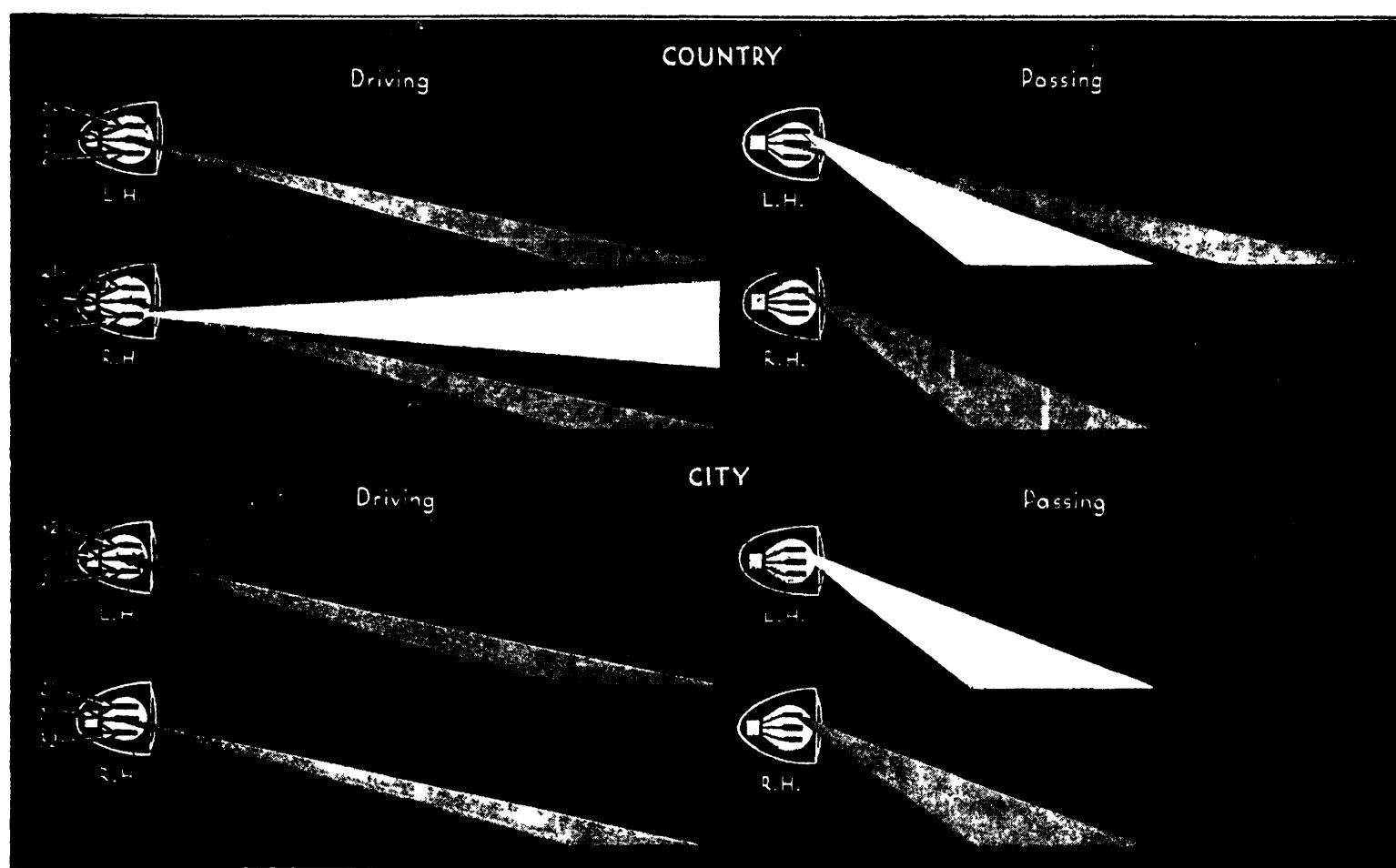


Fig. 4.

Diagrammatic elevation of Super-Safe Light beams.

1932 Valve and Ignition Timing Specifications

COMPILED FOR USE WITH WEIDENHOFF MOTOR GAUGE

1932 Passenger Cars	Adapter	Rod	Stroke	Ignition Timing	Before or After T.D.C.	Spark Retard, Advance or Set	Intake Valve Opens	Before or After T.D.C.	Firing Order	Valve Clearances				Breaker Contact Separation	Spark Plug Gap (In.)
										Timing		Running			
										Int.	Exh.	Int.	Exh.		
AUBURN 8 100	102	2	4 3/4	060	B T C	Adv.	009	B T C	1-6-2-5 8-3-7 4	010	010	006	008	020	028
" 12 160	113	19	4 1/2	039	L T C	Adv.	T D C	" " "	{1L-2R-5L-4R-3L-1R- 6L-5R-2L-3R-4L-6R	015	015	008	008	020	025
AUSTIN	104	8	3	020	B T C	Adv.	T D C	B T C	1-3-4 2	003	003	003	003	018	020
BUICK 32-30	113	31	4 1/4	020	B T C	Adv.	006	B T C	1-6-2-5-8-3-7-4	008	008	008	008	* 025-30 * 020-25	0.28
" 32 60	113	31	4 5/8	044	B T C	Adv.	009	B T C	1-6-2-5-8-3-7-4	008	008	008	008	* 025-30 * 020-25	0.28
" 32-80 90	113	31	5	038	B T C	Adv.	008	B T C	1-6-2-5-8-3-7-4	008	008	008	008	* 025-30 * 020-25	0.28
CADILLAC V-8	104	29	4 15/16	081	B T C	Set	014	B T C	1-2-7-8-4-5-6-3	006	008	008	006	020	.025
" V-12	113	33	4	069	B T C	Set	T D C	" " "	1-4-9-8-5-2-11-10-3-6-7-12	A	A	A	A	020	.025
" V-16	113	33	4	085	B T C	Set	T D C	" " "	{1-8-9-14-3-6-11-2 15-10-7-4-13-12 5-16	A	A	A	A	016	025
CHEVROLET	113	19	3 3/4	043	B T C	Set	005	B T C	1-5-3-6-2-4	006	008	006	008	018	.024
CHRYSLER 6 Silver Dome	103-114	12- 2	4 1/2	034	B T C	Set	012	A T C	1-5-3-6-2-4	011	012	005	007	020	0.28
" 8 Silver Dome	103 114	12 29	4 1/2	034	B T C	Set	012	A T C	1-6-2-5-8-3-7-4	011	012	005	007	016	.028
" Imp. 8 Sil. Dom.	103 114	12 29	5	038	B T C	Set	014	A T C	1-6-2-5-8-3-7-4	011	012	005	007	016	0.28
FORD	104	29	4 1/2	060	B T C	Adv.	008	B T C	1-6-2-5-8-3-7-4	010	010	008	008	022	0.25
MUNNINGHAM	102	1	5	055	A T C	Ret	010	A T C	1-5-4-8-6-3-7-2	0015	003	0015	008	018	.022
DE SOTO 6	103 114	12 2	4 1/4	026	B T C	Set	011	A T C	1-5-3-6-2-4	011	012	005	007	020	0.28
DE VAUX	104	2	4	011	B T C	Adv.	007	A T C	1-5-8-6-2-4	008	010	006	008	020	.028
DODGE 6	103 114	12 2	4 3/8	032	B T C	Set	012	A T C	1 5-3 6-2-4	011	012	005	007	020	0.23
" 8	103-114	12 29	4 1/2	032	B T C	Set	012	A T C	1-6-2 5-8-3-7 4	011	012	005	007	016	0.28
DUESENBERG	104	2	4 5/8	043	B T C	Adv.	013	B T C	1-6-2-5-8-3-7 4	025	025	025	025	022	0.22
DURANT 621-612	104	2	4	011	P T C	Adv.	008	A T C	1 5-8-6-2-4	012	012	008	008	020	0.25
ESSEX	104	2	4 1/2	* 018 T D C	B T C	Set	039	B T C	1-5-3-6-2-4	010	010	004	006	020	0.22
ORD A	102	7	4 1/4	027	B T C	Adv.	018	B T C	1-2-4-3	015	015	015	015	020	0.35
" V 8	104	4	3 3/4	042	B T C	Adv.	252	A T C	1 5-4-8-6-3-7-2	015	015	015	015	012-15	0.25
RANKLIN	104	2	4 1/4	042	B T C	Adv.	T D C	A T C	1-4-2 6-3-5	031	031	003	006	020	0.27-35
RAHAM 6	102	2	1 1/2	042	B T C	Adv.	T D C	A T C	1 5-3 6-2-4	010	010	006	008	020	0.25
" 8	102	2	4	011	B T C	Adv.	T D C	A T C	1 6-2-5-8-3-7-4	.010	010	006	008	020	0.25
HUDSON 8	104	2	4 1/2	* 021 T D C	B T C	Set	039	B T C	1-6-2 5-8-3-7-4	010	010	004	006	020	0.22
HUPMOBILE 214	104	2	4 1/4	032	B T C	Adv.	005	A T C	1-5-3-6-2-4	010	010	008	008	018	0.28
" 216	104	2	4 1/4	(32	B T C	Adv.	005	A T C	1-5-3-6-2-4	010	010	006	008	018	0.24
" 218	104	2	4 1/4	140	B T C	Adv.	002	A T C	1 4 7-3-8-5-2-6	010	020	007	015	020	0.24
" 221	104	2	4 3/8	029	B T C	Adv.	002	A T C	1-4-7-3-8-5-2-6	010	020	007	015	020	0.28
" 222	104	2	4 1/4	061	B T C	Adv.	T D C	A T C	1-4-7-3-8-5-2-6	017	017	018	018	022	0.28
" 225-227	104	2	4 3/8	023	B T C	Adv.	002	A T C	1 4-7-3-8-5-2-6	010	020	007	015	022	0.28
" 226	104	2	4 1/4	029	B T C	Adv.	036	A T C	1-4-7 3 8-5-2-6	010	020	007	015	022	0.30
LA SALLE	104	29	4 1 /16	031	B T C	Set	014	B T C	1-2-7-8-4-5-6-3	006	005	008	006	020	0.25
LINCOLN 8	102	2	5	019	B T C	Adv.	190	B T C	1R-4L-2R-3L-4R-1L-3R 2L	.004	.005	.004	.005	018	0.32
" 12	102	2	4 1/2	017	B T C	Adv.	150	B T C	1-4-9-8-5-2-11-10-3 6-7-12	.004	.005	.004	.005	018	0.32
MARMON 8-12	104	2	4 1/2	010	B T C	Adv.	T D C	B T C	1-6-2-5-8-3-7-4	.010	.010	008	008	.022	0.25
" 16	104	2	4	011	B T C	Adv.	011	B T C	{R1-6-2-5-8-3-7-4 L8-3-7-4-1-6-2-5	.010	.010	008	008	018	0.22
NASH 1060	114	2	4 3/8	008	B T C	Set	007	A T C	1-5 3-6-2-4	008	008	008	.008	020	0.23
" 1070	114	2	4 1/4	008	L T C	Set	007	A T C	1-6-2-5-8-3-7-4	.008	.008	008	.008	020	0.23
" 1080	*113	37	4 1/4	072	B T C	Adv.	072	A T C	1-6-2-5-8-3-7-4	008	008	008	008	020	0.23
" 1090	113	3	4 1/2	077	B T C	Adv.	077	A T C	1 6 2 5-8-3-7-4	008	008	008	800	.020	0.23
OLDSMOBILE 6	104	2	4 1/8	020	B T C	Set	T D C	A T C	1-5-3 6-2-4	.008	.010	008	.010	020	0.25
" 8	104	2	4 1/4	020	B T C	Set	T D C	A T C	1-6 2-5-8-3-7-4	008	.010	008	.010	.020	0.25
LACKARD 128	114	2	5	{055L 031S 006H 0.55L 031S 006H 055L 031S 001H	B T C	Adv.	.151	B T C	1-6 2-5-8-3-7-4	004	004	004	004	018	0.28
" 901-902	114	2	5	{031S 006H 055L 031S 006H 055L 031S 001H	B T C	Adv.	151	B T C	1-6-2 5-8-3-7-4	004	004	004	.004	018	0.28
" 903 904	114	2	5	{031S 001H	B T C	Adv.	151	B T C	1-6 2-5-8-3-7-4	004	004	004	004	.018	0.28
" 905-906	114	2	3 1/2	021	B T C	Adv.	T D C	A T C	{1R-6L-5R-2L-3R-4L- 6R-1L-2R-5L-4R-3L	A	A	A	A	018	.028
PIERLESS	104	2	4 1/2	016	B T C	Adv.	001	A T C	1-6-2-5 8-3-7-4	012	012	007	007	020	0.25
PIERCE ARROW 51 52	114	29	4	020	B T C	Adv.	005	B T C	{1L-2R-5L-4R- 3L-1R-6L-5R- 2L-3R-4L-6R	004	006	004	006	018	0.22
" 53	114	29-	4	020	B T C	Adv.	005	B T C	{1L-2R-5L-4R- 3L-1R-6L-5R- 2L-3R-4L-6R	004	006	004	006	018	.022
" 54	102	2	4 3/8	023	B T C	Adv.	009	B T C	1 6-2-5-8-3-7-4	.004	006	004	.006	.022	0.22
PLYMOUTH	{10 114	{12 40	{4 3/8 4 1/2	{046 046	{B T C B T C	{Set Set	{013 013	{A T C A T C	{1-3-4-2 1-5 3-6-2-4	.008 010	.009 010	.005 010	.007 010	020 022	0.28
PONTIAC 6	114	2	3 3/8	018	B T C	Set	T D C	B T C	1-5 3 6-2-4	010	010	010	010	022	0.22
" 8	114	8	3 3/8	022	B T C	Set	T D C	B T C	1-4 5-2-7-6 3 5	012	012	012	012	016	0.22
RFO 6-21-25	104	2	5	035	B T C	Adv.	T D C	B T C	1 5 3 6 2 4	012	012	007	008	022	0.25
" 8 21-25	104	2	4 3/8	{048* 013* 048* 014	B T C	Adv.	009	B T C	1-6 2-5-8 3-7-4	012	012	007	.008	021	0.25
" 31 35	104	2	5	{048* 014	B T C	Adv.	T D C	B T C	1-6-2-5-8-3-7-4	012	012	008	008	020	0.25
ROCKNE 6 65	102	2	4 1/8	009	B T C	Adv.	008	B T C	1-5-3-6-2-4	010	010	004	006	020	0.25
" 6-75	102	2	4 1/8	012	B T C	Adv.	008	B T C	1-4-2-6-3-5	010	010	004	006	020	0.25
RUDEBAKER 6	102	2	4 3/8	009	B T C	Adv.	008	A T C	1-4-2 6-3 5	010	010	004	.007	020	0.25
" Dict. 8	10	2	3 3/8	023	B T C	Adv.	T D C	B T C	1-6-2-5-8-3-7-4	010	010	004	.007	020	0.25
" Comd. 8	10	2	4 1/4	026	B T C	Adv.	072	B T C	1-6-2-5-8-3-7-4	010	010	004	.007	020	0.25
" Pres. 8	102	2	4 1/4	021	B T C	Adv.	008	A T C	1-6 2-5-8-3-7-4	010	010	004	.007	020	0.25
STUTZ SV 16	113	31	4 1/2	077	B T C	Adv.	001	B T C	1-6-2-5-8-3-7 4	032	032	032	032	017	0.22
" DV 32	104	8	4 1/2	136	B T C	Adv.	009	B T C	1-6-2-5-8-3-7-4	.046	.046	.046	.046	.017	0.22
WILLYS OV 6-90	104	2	3 3/8	T D C	B T C	Adv.	T D C	B T C	1-5-3-6-2-4	008	009	004	006	.018	.022
" OV-8-88	104	40	4	014	B T C	Adv.	T D C	B T C	1-6-2-5-8-3-7-4	010	010	006	008		

EXPLANATION OF ABBREVIATIONS

Ad - Advanced Spark Ret - Retarded Spark B.T.C. - Before Top Center H - Hot T.D.C. - Top Dead Center A - Automatic Take-up for valve clearances A.T.C. - After Top Center C - Cold

Note: On Valve Sleeve Engines 'Exhaust Valve Closing' instead of 'Intake Valve Opening' is given See instructions for timing valves in Sleeve Motors

Packard has 3 ignition timing settings: L for low compression, S for standard compression and H for high compression

* Buick uses 2 types spark plugs: H 9 for high compression with .020-.025 gap and J-12 for low compression with .025-.030 gap.

* 21-25 31-35 Reo has given two settings: 013 for straight run fuel and 043 for Ethyl or high compression.

* Nash 1080 uses a 14 mm spark plug special attachment No. 150 for 113 adapter must be used

* Hudson Essex have given two settings for ignition timing: T D C for straight run fuel in both cars, 018 B T C for Essex and 021 B T C for Hudson, when using Ethyl or high compression fuel

DISCONNECT STARTER BEFORE TURNING ON SWITCH

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1933 Valve and Ignition Timing Specifications

COMPILED FOR USE WITH WEIDENHOFF MOTOR GAUGE

1933 Passenger Cars	Adapter	Rod	Stroke	Ignition Timing	Before or After T.D.C.	Spark Retard, Advance or Set	Intake Valve Opens	Before or After T.D.C.	Firing Order	Valve Clearances				Breaker Contact Separation	Spark Plug Gap (Ins.)
										Timing		Running			
										Int.	Exh.	Int.	Exh.		
AUBURN 8-101.....	102	2	4¾	.063	B.T.C.	Adv.	.010	B.T.C.	1-6-2-5-8-3-7-4	.012	.012	.006	.006	.018	.026
" 8-105.....	102	2	4¾	.063	B.T.C.	Adv.	.010	B.T.C.	1-6-2-5-8-3-7-4	.012	.012	.006	.006	.018	.026
" 12-161.....	113	19	4¾	.044	B.T.C.	Adv.	T.D.C.	.....	{ 1L-2R-5L-4R-3L-1R- 6L-5R-2L-3R-4L-6R	.015	.015	.010	.010	.018	.025
" 12-165.....	113	19	4¾	.044	B.T.C.	Adv.	T.D.C.	.....		.015	.015	.010	.010	.018	.025
AUSTIN L.....	104	8	3	.020	B.T.C.	Adv.	T.D.C.	.....	1-3-4-2	.003	.004	.003	.004	.020	.030
BUICK 50.....	113	31	4¾	.018	B.T.C.	Adv.	.007	B.T.C.	1-6-2-5-8-3-7-4	.008	.008	.008	.008	.016	.025*
" 60.....	113	31	4½	.048	B.T.C.	Adv.	.008	B.T.C.	1-6-2-5-8-3-7-4	.008	.008	.008	.008	.016	.025*
" 80.....	113	31	5	.044	B.T.C.	Adv.	.009	B.T.C.	1-6-2-5-8-3-7-4	.008	.008	.008	.008	.016	.025*
" 90.....	113	31	5	.044	B.T.C.	Adv.	.009	B.T.C.	1-6-2-5-8-3-7-4	.008	.008	.008	.008	.016	.025*
CADILLAC V-8.....	104	29	4 15/16	.036	B.T.C.	Adv.	.015	B.T.C.	1-2-7-8-4-5-6-3	.006	.008	.006	.008	.016	.028
" V-12.....	113	33	4	.076	B.T.C.	Set	T.D.C.	.....	1-4-9-8-5-2-11-10-3-6-7-12	A	A	A	A	.016	.028
" V-16.....	113	33	4	.037	B.T.C.	Set	T.D.C.	.....	{ 1-8-9-14-3-6-11-2- 15-10-7-4-13-12-5-16	A	A	A	A	.015	.028
CHECKER CAB.....	102	2	4¾	.060	B.T.C.	Adv.	.....	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.006	.008	.022	.025
CHEVROLET Eagl.....	113*	19	4	.035	B.T.C.	Set	.006	B.T.C.	1-5-3-6-2-4	.010	.010	.006	.008	.018	.032
" Stand.....	113*	19	3½	.030	B.T.C.	Set	.005	B.T.C.	1-5-3-6-2-4	.010	.010	.006	.008	.018	.032
CHRYSLER 6 Silver Dome	103-114	12- 2	4½	.043*	B.T.C.	Set	.014	A.T.C.	1-5-3-6-2-4	.011	.012	.005	.007	.020	.025
" 6 Red Head..	103-114	12-40	4½	.027*	B.T.C.	Set	.014	A.T.C.	1-5-3-6-2-4	.011	.012	.005	.007	.020	.025
Chrysler—Above timing for Delco-Remy 622-C Distributors. Timing for Delco-Remy 644-L Distributors is exact T.D.C.															
" Royal 8 Silver Dome.....	103-114	12-29	4½	.001	B.T.C.	Set	.013	A.T.C.	1-6-2-5-8-3-7-4	.011	.012	.005	.007	.016	.025
" Royal 8 Red Head.....	103-114	12-40	4½	T.D.C.	.....	Set	.013	A.T.C.	1-6-2-5-8-3-7-4	.011	.012	.005	.007	.016	.025
" Imp. 8 Silver Dome "CQ".....	103-114	12-29	4½	.043*	B.T.C.	Set	.015	A.T.C.	1-6-2-5-8-3-7-4	.011	.012	.005	.007	.016	.025
" Imp. 8 Red Head "C Q".....	103-114	12-40	4½	.021*	B.T.C.	Set	.015	A.T.C.	1-6-2-5-8-3-7-4	.011	.012	.005	.007	.016	.025
Above timing for model "CQ" with Delco-Remy 661-G Distributor. If Delco-Remy 661-T distributor is used time ignition on "Silver Dome" engines .002 inch after T.D.C. and "Red Head" .011 inches after T.D.C.															
" Custom Imp. 8	103-114	12-29	5	.038	B.T.C.	Set	.015	A.T.C.	1-6-2-5-8-3-7-4	.011	.012	.005	.007	.016	.028
CONTINENTAL Beacon..	104	2	4	.005	B.T.C.	Set	T.D.C.	.....	1-3-4-2	.010	.010	.008	.008	.020	.025
" Flyer.....	104	2	4	.001	B.T.C.	Set	.012	B.T.C.	1-5-3-6-2-4	.010	.010	.008	.008	.020	.025
" Ace.....	104	2	4	.003	B.T.C.	Set	.008	B.T.C.	1-5-3-6-2-4	.012	.012	.008	.008	.020	.025
CORD.....	104	29	4½	.060	B.T.C.	Adv.	.010	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.006	.008	.018	.025
CUNNINGHAM V-10.....	102	1	5	.....	.....	.....	.011	A.T.C.	1-5-4-8-6-3-7-2	.003	.003	.002	.002	.018	.031
" W-1.....	102	1	4½	.....	.....	.....	.001	A.T.C.	1-6-2-5-8-3-7-4	.012	.012	.010	.010	.020	.028
DE SOTO Silver Dome..	103-114	12- 2	4¾	T.D.C.	.....	Set	.014	A.T.C.	1-5-3-6-2-4	.011	.012	.005	.007	.020	.025
" Red Head.....	103-114	12- 2	4¾	.015	A.T.C.	Set	.014	A.T.C.	1-5-3-6-2-4	.011	.012	.005	.007	.020	.025
DODGE 6 Stand.....	103-114	12-42	4¾	.042	B.T.C.	Set	.013	A.T.C.	1-5-3-6-2-4	.011	.012	.005	.007	.020	.025
" 6 High Com.....	103-114	12-42	4¾	.021	B.T.C.	Set	.013	A.T.C.	1-5-3-6-2-4	.011	.012	.005	.007	.020	.025
" 8 Standard.....	103-114	12-42	4¾	.040	B.T.C.	Set	.013	A.T.C.	1-6-2-5-8-3-7-4	.011	.012	.005	.007	.016	.025
" 8 High Com.....	103-114	12-42	4¾	.019	B.T.C.	Set	.013	A.T.C.	1-6-2-5-8-3-7-4	.011	.012	.005	.007	.016	.025
DUESENBERG J.....	104	8	4¾	.049	B.T.C.	Adv.	.015	B.T.C.	1-6-2-5-8-3-7-4	.022	.022	.022	.022	.022	.025
" S-J.....	104	8	4¾	.049	B.T.C.	Adv.	.015	B.T.C.	1-6-2-5-8-3-7-4	.022	.022	.022	.022	.022	.025
ESSEX Terraplane Six..	114	42	4¾	T.D.C.*	.....	Set	.049	B.T.C.	1-5-3-6-2-4	.006	.008	.006	.008	.020	.022
" Terraplane Eight	114	42	4½	T.D.C.*	.....	Set	.047	B.T.C.	1-6-2-5-8-3-7-4	.006	.008	.006	.008	.020	.022
FORD V-8.....	104	2	3¾	.006	B.T.C.	Set	.030	B.T.C.	1-5-4-8-6-3-7-2	.013	.013	.013	.013	.013	.025
" "B".....	102	7	4¾	.131	B.T.C.	Set	.023	B.T.C.	1-2-4-3	.012	.021	.012	.018	.020	.030
FRANKLIN 16-B.....	113*	6	4¾	.015	B.T.C.	Adv.	.308	A.T.C.	1-4-2-6-3-5	.031	.031	.007	.007	.020	.025
" 18.....	113*	6	4¾	.015	B.T.C.	Adv.	.308	A.T.C.	1-4-2-6-3-5	.031	.031	.007	.007	.020	.025
" 17-B.....	113*	6	4	.017	B.T.C.	Adv.	.123	A.T.C.	{ 1R-6L-4R-3L-2R-5L- 6R-1L-3R-4L-5R-2L	.031	.031	.007	.007	.022	.025
GRAHAM 6.....	102	2	4½	.004	B.T.C.	Set	T.D.C.	.....	1-5-3-6-2-4	.010	.012	.010	.012	.018	.025
" Standard 8....	102	2	4	.003	B.T.C.	Set	T.D.C.	.....	1-6-2-5-8-3-7-4	.010	.012	.010	.012	.016	.025
" Custom 8.....	102	2	4	.003	B.T.C.	Set	T.D.C.	.....	1-6-2-5-8-3-7-4	.010	.012	.010	.012	.016	.025
HUDSON Super 6.....	114	9	4¾	T.D.C.*	.....	Set	.049	B.T.C.	1-5-3-6-2-4	.006	.008	.006	.008	.020	.022
" Super 8.....	114	42	4½	T.D.C.*	.....	Set	.047	B.T.C.	1-6-2-5-8-3-7-4	.006	.008	.006	.008	.020	.022
HUPMOBILE 6-321.....	104	2	4¾	.018	B.T.C.	Adv.	.001	B.T.C.	1-5-3-6-2-4	.010	.013	.010	.013	.015	.028
" 8-322.....	104	2	4¾	.033	B.T.C.	Adv.	T.D.C.	.....	1-4-7-3-8-5-2-6	.018	.018	.018	.018	.020	.028
" 8-326.....	104	2	4¾	.031	B.T.C.	Adv.	.004	A.T.C.	1-4-7-3-8-5-2-6	.018	.018	.018	.018	.020	.028
LA SALLE.....	104	29	4 15/16	.036	B.T.C.	Set	.015	B.T.C.	1-2-7-8-4-5-6-3	.006	.008	.006	.008	.016	.028
LINCOLN V-12 (136)....	102	2	4½	.017	B.T.C.	Adv.	.169	B.T.C.	1-4-9-8-5-2-11-10-3-6-7-12	.003	.005	.003	.005	.020	.025
" V-12 (145).....	102	2	4½	.017	B.T.C.	Adv.	.169	B.T.C.	1-4-9-8-5-2-11-10-3-6-7-12	.003	.005	.003	.005	.020	.025
MARMON 16.....	104	2	4	.013	B.T.C.	Adv.	.012	B.T.C.	{ 1L-3R-6L-7R-2L-4R-5L- 1R-8L-6R-3L-2R-7L-5R- 4L-8R	.014	.014	.008	.008	.018	.022
NASH Big 6.....1120....	104	2	4¾	.003	B.T.C.	Set	.010	A.T.C.	1-5-3-6-2-4	.008	.008	.008	.008	.020	.022
" Std. 8 ...1130....	104	2	4¾	.003	B.T.C.	Set	.010	A.T.C.	1-6-2-5-8-3-7-4	.008	.008	.008	.008	.020	.022
" Spec. 8 ...1170....	104	2	4¾	.008	B.T.C.	Set	.010	A.T.C.	1-6-2-5-8-3-7-4	.008	.008	.008	.008	.020	.022
" Adv. 8 ...1180....	113*	37	4¾	.072	B.T.C.	Adv.	.082	A.T.C.	1-6-2-5-8-3-7-4	.012	.012	.012	.012	.020	.022
" Amba. 8 1190....	113	33	4¾	.077	B.T.C.	Adv.	.086	A.T.C.	1-6-2-5-8-3-7-4	.012	.012	.012	.012	.020	.022
OLDSMOBILE "F".....	104	2	4½	.004	B.T.C.	Set	T.D.C.	.....	1-5-3-6-2-4	.010	.010	.008	.010	.022	.025
" "L".....	104	2	4¾	.004	B.T.C.	Set	T.D.C.	.....	1-6-2-5-8-3-7-4	.010	.010	.008	.010	.022	.025

1933 Valve and Ignition Timing Specifications (continued)

1933 Passenger Cars	Adapter	Rod	Stroke	Ignition Timing	Before or After T.D.C.	Spark Retard, Advance or Set	Intake Valve Opens	Before After T.D.C.	Firing Order	Valve Clearances				Breaker Contact Separation	Spark Plug Gap (Ins.)
										Timing		Running			
										Int.	Exh.	Int.	Exh.		
PACKARD (1001).....	114	5	5	.035*	B.T.C.	Adv.	.364	B.T.C.	1-6-2-5-8-3-7-4	.004	.006	.004	.006	.020	.025
" (1002).....	114	5	5	.035*	B.T.C.	Adv.	.364	B.T.C.	1-6-2-5-8-3-7-4	.004	.006	.004	.006	.020	.025
" (1003).....	114	5	5	.035*	B.T.C.	Adv.	.364	B.T.C.	1-6-2-5-8-3-7-4	.004	.006	.004	.006	.020	.025
" (1004).....	114	5	5	.035*	B.T.C.	Adv.	.364	B.T.C.	1-6-2-5-8-3-7-4	.004	.006	.004	.006	.020	.025
" (1005).....	114	5	4	.017	B.T.C.	Adv.	T.D.C.	.....	1R-6L-5R-2L-3R-4L- 6R-1L-2R-5L-4R-3L	A	A	A	A	.020	.025
" (1006).....	114	5	4	.017	B.T.C.	Adv.	T.D.C.	.....		A	A	A	A	.020	.025
Packard has 3 ignition timing settings. Above for standard heads; .055 B.T.C. for low compression heads, and .006 B.T.C. for high compression heads.															
PIERCE-ARROW (836)...	102	2	4¾	.025	B.T.C.	Set	.010	A.T.C.	1-6-2-5-8-3-7-4	.010	.010	A	A	.018	.025
" 1236...	114	29	4	.022	B.T.C.	Set	.006	B.T.C.	1L-2R-5L-4R-3L	.004	.006	A	A	.016	.022
" 1242...	114	29	4	.022	B.T.C.	Set	.006	B.T.C.	1R-6L-5R-2L-3R-	.004	.006	A	A	.016	.022
" 1247...	114	29	4	.022	B.T.C.	Set	.006	B.T.C.	4L-6R	.004	.006	A	A	.016	.022
PLYMOUTH 6 Silver Dome	103-114	12-40	4½	.039*	B.T.C.	Set	.014	A.T.C.	1-5-3-6-2-4	.011	.012	.005	.007	.020	.025
" 6 Red Head..	103-114	12-40	4½	.025*	B.T.C.	Set	.014	A.T.C.	1-5-3-6-2-4	.011	.012	.005	.007	.020	.025
Plymouth—Above timing for Delco-Remy 622-II Distributors. Timing for Delco-Remy 644-II Distributors (found on cars above No. 50357), "Silver Dome" is exact T.D.C.; "Red Head" is .001 inch after T.D.C.															
PONTIAC 8.....	114	42	3½	.005*	B.T.C.	Set	.007	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.010	.010	.016	.025
Above timing for cars driven up to 1500 miles; after that mileage timing should be .025 B.T.C.															
REO 6.....	104	2	5	.012*	B.T.C.	Adv.	T.D.C.	.....	1-5-3-6-2-4	.012	.012	.007	.007	.020	.025
" Royale 8.....	104	2	5	.014*	B.T.C.	Adv.	T.D.C.	.....	1-6-2-5-8-3-7-4	.012	.012	.008	.008	.020	.025
ROCKNE 6.....	104	2	4½	T.D.C.	.....	Set	.009	B.T.C.	1-5-3-6-2-4	.010	.010	.004	.006	.020	.025
STUDEBAKER 6.....	104	2	4½	T.D.C.	.....	Adv.	.010	A.T.C.	1-4-2-6-3-5	.010	.010	.004	.006	.020	.025
" 8 Comd.	104	2	4	.023	B.T.C.	Adv.	.076	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.004	.006	.020	.025
" 8 President	104	2	4¾	.023	B.T.C.	Adv.	.082	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.004	.006	.020	.025
" 8 Speedway															
President	104	2	4½	T.D.C.	.....	Adv.	.010	A.T.C.	1-6-2-5-8-3-7-4	.010	.010	.004	.006	.020	.025
STUTZ (LAA).....	113	31	4½	.086	B.T.C.	Adv.	.001	B.T.C.	1-5-3-6-2-4	.028	.028	.028	.028	.017	.025
" (C.S.) S.V.....	113	31	4½	.086	B.T.C.	Adv.	.001	B.T.C.	1-6-2-5-8-3-7-4	.028	.028	.028	.028	.017	.025
" (C.D.) D.V.....	104	8	4½	.152	B.T.C.	Adv.	.009	B.T.C.	1-6-2-5-8-3-7-4	.046	.046	.046	.046	.020	.022
WILLYS 4.....	104	2	4½	.006	B.T.C.	Set	T.D.C.	.....	1-3-4-2	.010	.010	.004	.006	.018	.025
" 6.....	104	2	4½	.013	B.T.C.	Adv.	T.D.C.	.....	1-5-3-6-2-4	.010	.010	.006	.008	.018	.025
WILLYS-KNIGHT 66-E..	100	6	4¾	.104	B.T.C.	Adv.	.041	B.T.C.	1-5-3-6-2-4	.010	.010	.006	.008	.018	.025
WILLYS-OVERL'D 6-90A	104	2	3¾	T.D.C.	.....	Adv.	.016	B.T.C.	1-5-3-6-2-4	.008	.009	.004	.006	.018	.027
" 8-88A	104	42	4	.013	B.T.C.	Adv.	T.D.C.	.....	1-6-2-5-8-3-7-4	.010	.010	.006	.008	.018	.027

EXPLANATION OF ABBREVIATIONS

Adv.—Advanced Spark B.T.C.—Before Top Center H—Hot T.D.C.—Top Dead Center A—Automatic Take-up for valve clearances. A.T.C.—After Top Center C—Cold Ret.—Retarded Spark

*Buick uses two types of spark plugs. 11-9 for high compression with .020-.025 gap and J-12 for low compression with .025-.030 gap.

*Reo has two given settings. Above timing for straight run fuel and .048 for Ethyl or high-compression.

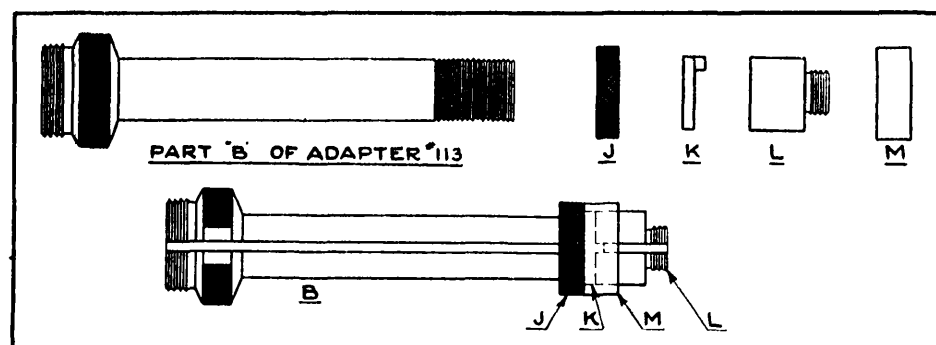
*Nash 1180 uses a 14 mm. spark plug, special attachment No. 150 for No. 113 adapter must be used.

*Hudson-Essex have two given settings for ignition timing. T.D.C. for straight run fuel on both cars. .041 B.T.C. for Essex and .021 B.T.C. for Hudson when using Ethyl or high-compression fuel.

Note—*Franklin—No. 120 plate to be used with No. 113 adapter. Place plate on top of No. 113 adapter, this is to keep rod from sliding thru.

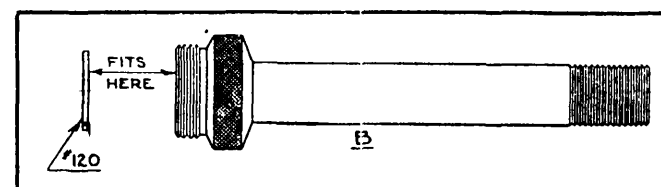
*Chevrolet uses 14 mm. spark plug, special attachment No. 151 for No. 113 adapter must be used.

Note—Cars using 14 mm. spark plugs, first insert rod through spark plug hole, and slip adapter over rod.



INSTRUCTIONS FOR USE OF SPECIAL ADAPTER NO. 151, ON 1933 CHEVROLET ENGINES EQUIPPED WITH 14-MM SPARK PLUGS

Screw Part "J" onto Part "B" as far as it will go, slide Part "K" against Part "J", screw on part "L" as far as it will go, then back off Part "L" until the slots line up. Slide "K" against "L", and then lock assembly with "J". Slide Part "M" over Part "L".



Part "B" of adapter No. 113, with the new No. 120 plate for use on Franklin engines.

1933 DELCO-REMY SEMI-AUTOMATIC STARTING DEVICES

Standard Equipment on Buick, Chevrolet, Chrysler, DeSoto, Dodge, and Pontiac Automobiles.

One of the outstanding 1933 developments in electrical equipment has been the perfection of semi-automatic starting devices which are now found on many automobiles. Because of the fact that various principles and combination of principles have been employed in perfecting the five different types of devices now in general use, we will give individual descriptions of each.

CHEVROLET STARTERATOR (VACUUM OPERATED).

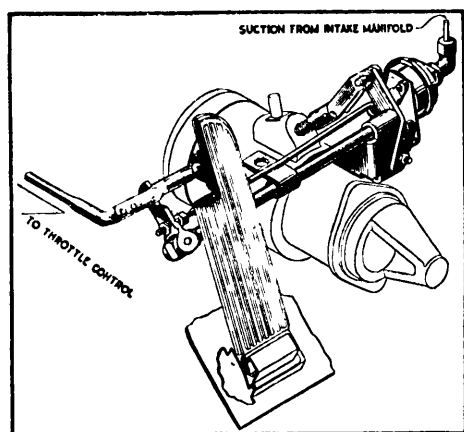


Fig. 1

The Combination Foot Accelerator-Starting Switch Mechanism, as used on the 1933 Chevrolets.

The device has two other levers, one connected to the accelerator pedal, and the other linked to the carburetor control rods. A vacuum unit constitutes part of the selector assembly, and is operated from the intake manifold vacuum. The vacuum unit diaphragm is connected by a linkage to the selector clutch plate assembly. The clutch plate assembly is designed to slide on the splined end of the selector shaft. The throttle lever is clamped to the shaft which operates inside the selector shaft, while the selector throttle plate assembly is rigidly fixed to the other end of the throttle shaft. The throttle plate has a tang (or projection) which engages with a tang on the clutch plate.

OPERATION:

When the accelerator pedal is depressed, the starting pedal is moved in unison with the accelerator lever. The throttle lever is adjusted so that the accelerator lever and starting pedal move approximately twelve degrees before the engagement is made, or before the carburetor butterfly is opened. After approximately twelve degrees of travel, all three levers will move simultaneously in same direction, and each will have the same amount of

This starting device eliminates the conventional separate starting pedal. The foot accelerator now functions as the starting pedal until such time as the engine begins to run, at which time a vacuum diaphragm, operated from the intake manifold, automatically uncouples the mechanical connection between the foot accelerator pedal and the starting motor switch. Should the engine stop for any reason the mechanical connection between the foot accelerator pedal and the starting motor switch is again completed. This method of linking in the foot accelerator with the starting operation is quite simple, and in many respects similar to the Delco-Remy "Selector" method employed on the early 1933, six cylinder Chryslers and DeSotos.

DELCO-REMY 1550 SELECTOR (VACUUM OPERATED).

The Delco-Remy 1550 Selector starting device (see Figure 2), used on early model 1933 six cylinder Chrysler and DeSoto automobiles, also combines the control of the starting motor with that of the accelerator pedal. The selector unit is mounted on the dash, back of the engine, and just above the starting motor, so that the selector starting pedal is from 1/16 to 1/8 of an inch away from the roller in the pinion shift lever.

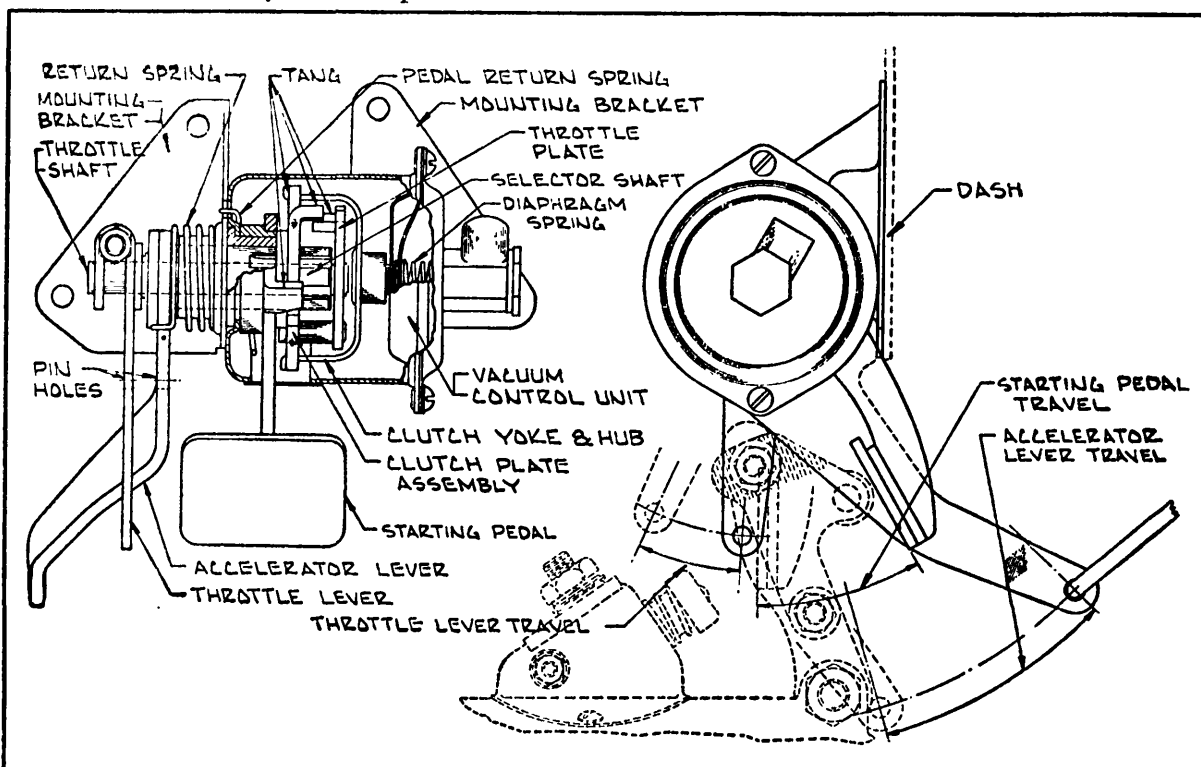


Fig. 2

The Delco-Remy No. 1550 Selector, as used on the 1933 Chryslers.

travel. Further movement of the accelerator pedal opens the butterfly valve in the carburetor, engages the pinion with the fly-wheel, and also closes the starting motor switch, causing the starter to crank the engine.

As soon as the engine starts one should relieve the downward pressure of the foot on the accelerator pedal. The vacuum created in the intake manifold will immediately cause the vacuum control unit to operate, declutching the starting pedal. This permits the starting pedal return spring to move the pedal back to its inoperative position and, at the same time, permits the shift lever return spring to disengage the pinion from the flywheel. As long as the engine is running there is sufficient vacuum to prevent another engagement of the starting motor during the continued operation of the engine.

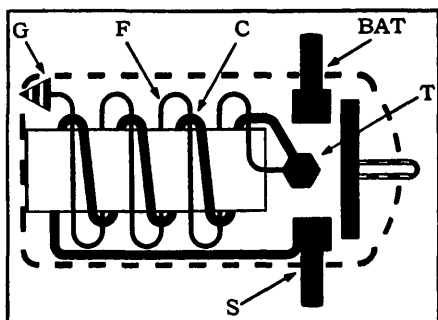


Fig. 3
Internal circuit diagram of the Delco-Remy No. 1503 Solenoid Starting Switch, as used on the 1933 Pontiacs.

As the foot is removed from the accelerator pedal, the return spring on the accelerator lever returns it to the idling position. When the engine is stopped, the lack of vacuum disengages the tang on the clutch plate from the slot in the throttle plate, and the accelerator lever returns to the starting position. The engine is now ready for another cranking operation. Whenever the engine stalls, removing the foot from the accelerator will allow all the parts to return to their inoperative position. Should the starting motor fail to crank the engine, due to a weak or discharged battery, the pinion will automatically be demeshed from the flywheel teeth by removing the foot from the accelerator. Return springs on the accelerator lever and starting pedal will restore these moving parts to their inoperative position.

ADJUSTMENTS:

The roller on the shift lever should be $1/16$ to $1/8$ of an inch from pad on selector starting pedal, and in the center of the pad. By loosening the two bolts in lever the plate holding the roller may be moved towards and away from the pad, as well as up and down. There is a No. 9 hole drilled in the throttle lever and accelerator lever for the purpose of obtaining the correct relation between these two levers. Align these holes with a steel pin of the proper size, adjust the throttle control rod so that the engine will properly idle, and after a satisfactory throttle adjustment has been obtained, remove the pin.

MAINTENANCE:

It is very essential that there are no air leaks in any connections on the vacuum line. All linkage and levers should be kept free from binding with other parts of the car, or with each other.

CAUTION: The vacuum unit diaphragm is connected to the clutch yoke hub by means of a stud. When assembling the vacuum control, first turn the entire unit by hand in a clockwise direction, until the limit of motion is reached. Next, back the assembly away from the bottom position to position as indicated on the cover plate. This must be at least one quarter turn (if less than one quarter turn, make another complete turn), which will give sufficient clearance within the selector to prevent binding of parts.

SOLENOID STARTER SWITCHES.

The idea of employing a solenoid to close the starting switch contacts, by simply pressing a "Remote Control" push button, located at some convenient place on the instrument board, is not new; however, it was not until this year that they have been used in any great quantities.

THE PONTIAC SOLENOID (PUSH BUTTON CONTROLLED).

The internal circuits thru the Delco-Remy 1503 Solenoid, used on 1933 Pontiac cars, are shown in Fig. 3. This Solenoid Switch, which is mounted on the starting motor (see Figure 4) is extremely simple in construction, and is designed to close only the starting switch contacts, as a Bendix Drive is employed to engage the starting motor pinion with the flywheel. From the circuit diagram it will be seen that there are two windings, "F" and "C" (connected in parallel), which cause the starting contacts to close. Both windings take their feed from the small terminal "T", Fig. 3, which terminal is connected to the remote control push button switch on the dash. One end of the fine winding "F" is grounded to the frame of the device at "G", while one end of the course winding "C" is connected to the large starting switch terminal "S" which, in turn, is connected to the starting motor. Should it be necessary to make a test on these windings it will be found that the current draw of the fine winding "F" is 3 amps. at 6 volts when the battery test leads are touched, one to small terminal "T" and the other to the frame (or ground); while the current draw of the course winding "C" is 12 amps. at 6 volts when the test is made between the small terminal "T" and the large starting terminal "S".

THE BUICK SOLENOID (PUSH BUTTON CONTROLLED).

The Delco-Remy 1501 and 1502 Solenoids, developed for the 1933 Buick automobiles, are a little more complicated, because of the fact that in addition to closing the starting switch contacts, the device also mechanically shifts the starter pinion, and causes it to mesh with the flywheel. These solenoid switches are rigidly mounted to the starting motor field frame. Inside the solenoid is a heavy plunger which is connected by linkage to the pinion shift lever. At one end of the switch are three terminals (see Figure 5). The two larger terminal posts are connected into the starting motor and battery circuit. The wire leading from the remote control switch is connected to the smallest terminal. When the ignition switch is turned to the "on" position and the remote control solenoid switch is closed, the plunger pulls the pinion into mesh with the flywheel teeth. The solenoid exerts a pull on the plunger, which is ample to overcome the resistance of shifting the pinion into mesh with the flywheel, and of closing the starting motor switch contacts. After the pinion shift lever has moved the distance required for meshing the pinion gear, the pointed end of the plunger touches the end of the contact plunger, and further movement closes the switch contacts; thus permitting the starting motor to crank the engine.

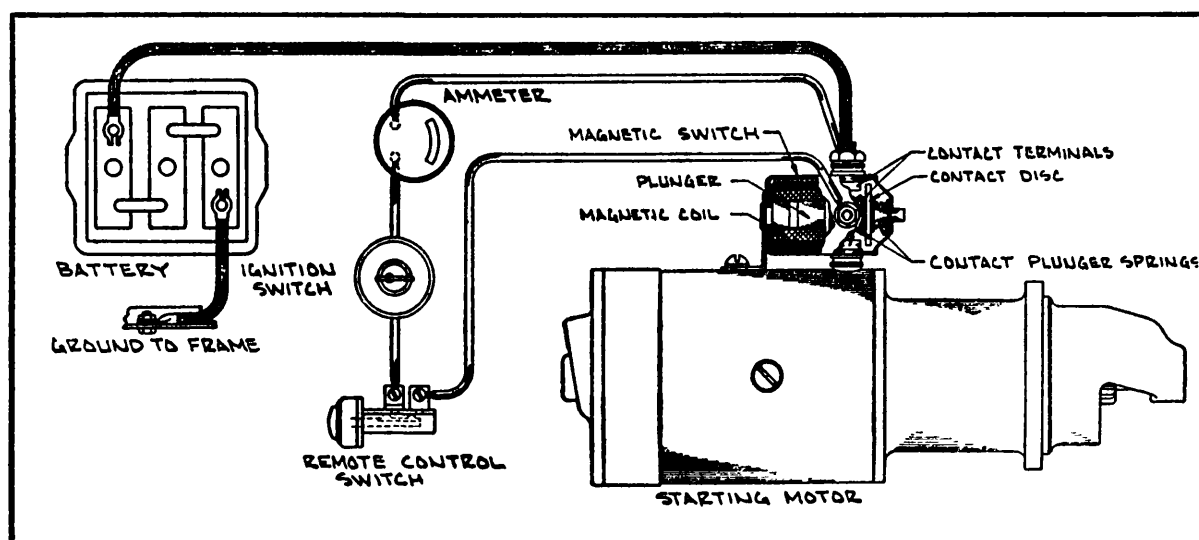


Fig. 4

Wiring diagram of the 1933 Pontiac Starting Device.

after the engine starts will permit the return spring on the shift lever to demesh the starting motor pinion. After the remote control switch is opened, instant neutralization of the magnetic field allows quick removal of the pinion from the flywheel. If the starting motor stalls when cranking the engine, due to a weak battery, the torque, or pressure, between the pinion teeth and the flywheel teeth is sufficient to hold the pinion in mesh. As soon as the solenoid control switch is opened, the contact plunger spring "A", which has been compressed, will move the contact disc away from contact terminals. The slot in the end of the shift lever permits the heavy plunger to be moved this distance. As soon as the starting motor switch circuit is opened, the pressure between the pinion and flywheel teeth is relieved, and the shift lever return spring will demesh the pinion.

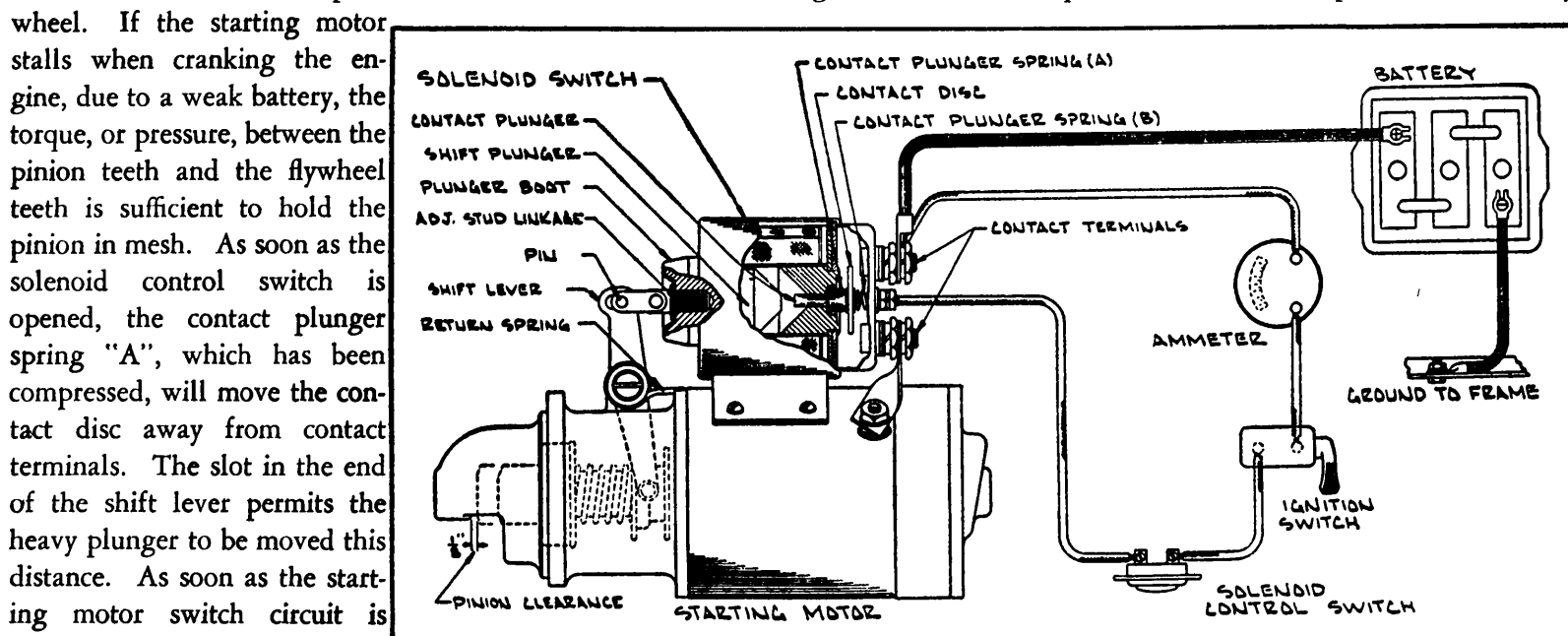


Fig. 5

Wiring diagram of the 1933 Buick Starting Device.

relieved, and the shift lever return spring will demesh the pinion.

ADJUSTMENTS:

It is essential that relation between the overrunning clutch drive and solenoid switch be maintained within certain limits. Bottom the solenoid plunger, and adjust the stud linkage so that there will be $\frac{1}{8}$ inch clearance between the end of the pinion and the starting motor drive housing. The pinion clearance adjustment can only be obtained accurately after the starting motor has been removed from the car. Checking the pinion clearance should be included in the bench test. This operation can best be accomplished by using the battery current to hold the plunger in the bottom position while adjusting the plunger stud linkage. Open the battery and starting motor circuit between the starting motor and solenoid switch, so that the pinion will not spin, close the circuit to the remote control switch terminal on the solenoid switch, push the plunger into the bottom position by hand, and the battery will then hold the plunger in the correct position for making the pinion clearance adjustment.

THE CHRYSLER SOLENOIDS (VACUUM AND RELAY CONTROLLED).

The Delco-Remy 1504, 1505, and 1506 Solenoids, used on the Chrysler, DeSoto and Dodge automobiles, differ from the Buick job only in their method of control. Instead of using the remote control push button switch the Chrysler engineers have replaced this switch by a switch which is linked in with the foot accelerator. The simple action of pressing down on the accelerator pedal closes the contacts in this special switch, and causes the starting motor solenoid to operate. Now, in order that

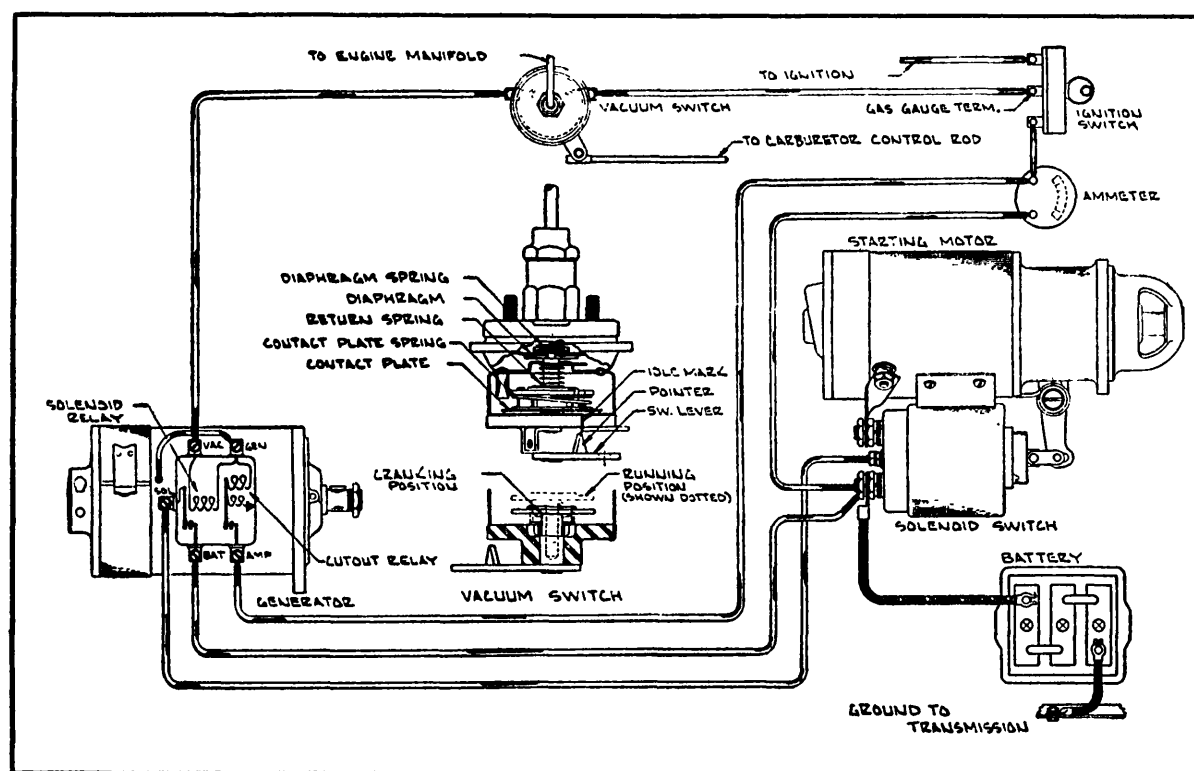


Fig. 6

Wiring diagram of the 1933 Chrysler, DeSoto, and Dodge Starting Devices, which make use of a Vacuum Switch and Relay Control.

an open circuit position (see Figure 6). The throttle may then be moved to a wide open position (on a hard pull) without allowing the spider to move over and make contact, even though the intake vacuum is practically lost under these conditions on a wide open throttle.

Whenever a car is free-wheeling the accelerator pedal is in the closed throttle position. In case the engine stalls while the car is free-wheeling, the contact plate is automatically unlatched, which permits it to again move over into contact with the switch back. When the accelerator is depressed, the circuit thru the vacuum switch will again be completed for cranking of the engine. Should the starting motor stall when cranking the engine, it is only necessary to release the accelerator pedal which, in turn, will open the vacuum switch circuit. The pinion will be removed from mesh by action of the solenoid switch and shift lever return spring.

In addition to this vacuum safety device, we find a control relay mounted on the generator, which gives additional protection against any possibility of starting motor action when the engine is running. If the generator is shorted, or the generator driving belt is broken, the starting motor will be protected by the vacuum switch alone. If the vacuum switch is not operating properly, due to leaks or other causes, the starter will be protected by the relay. Both of these control devices or switches are connected in the ignition circuit and, therefore, cannot be operated while the ignition is in the "off" position.

When the ignition switch is turned to the "on" position the winding in the relay will be energized by the current passing through the vacuum switch, then thru the relay winding to ground, thru the generator armature. Energizing the relay will close the relay contacts. Closing of the contacts completes the circuit between the battery and the solenoid switch remote control terminal (see Figure 6). The contact points in the remote control relay close at from 4.3 to 4.7 volts, and will remain closed while cranking, until the battery voltage becomes 2.0 volts or less. After the engine starts, the generator voltage builds up, and as soon as the difference between the generator voltage and battery voltage is 2.0 volts or less, the relay contact points will automatically open.

ADJUSTMENTS:

VACUUM SWITCH—The vacuum switch lever is provided with a pointer which will assist in obtaining the proper relation between the switch and throttle. On the rim of the back is a white mark. Adjust the carburetor throttle so that engine will idle, and then adjust the vacuum switch linkage so that the pointer will be opposite the white mark.

RELAY—The contact point opening of the remote control relay for the solenoid switch should be .050 to .055 inches. With the contact points closed, the air gap between the armature and core should be .077 to .099 inches. Contact points close at 4.3 to 4.7 volts, and open at 2.0 volts or less.

1933 SAFETY HEAD LIGHTS

In 1932 Cadillac Motor Car Co. adopted the "Super-Safe" lighting system, which necessitated the development of a special, three filament bulb, known as the Mazda No. 3001. This year the Packard Motor Car Co. has adopted the "Solar" lighting system, which caused the development of still another three filament bulb, known as the Mazda No. 3003. In addition to these systems we find other companies using the conventional two filament, bifocal bulbs but in an entirely different manner.

Since the year 1927, when the two filament No. 1110 Mazda bifocal bulb first made its appearance on Buick and Cadillac automobiles, this system of "tilt-beams" gained in popularity until, in the year 1931, practically all manufacturers were using it. Always in the past, however, either the upper filament in each bulb, or else the lower filament, worked together, in order to get a low or a high beam. Switches, necessary to control these bulbs, have usually been of the four position type; namely "Off"—"Park"—"High Beam" and "Low Beam".

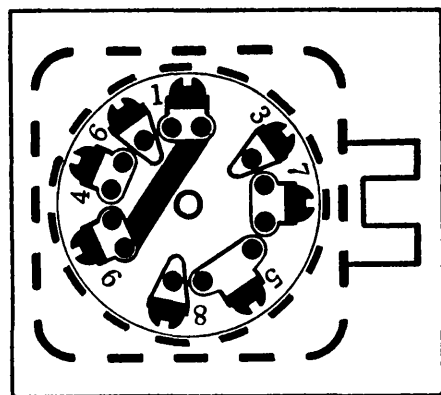


Fig. 1

The Five Position Clum Lighting Switch No. 9454, used on the 1933 Chrysler automobiles.

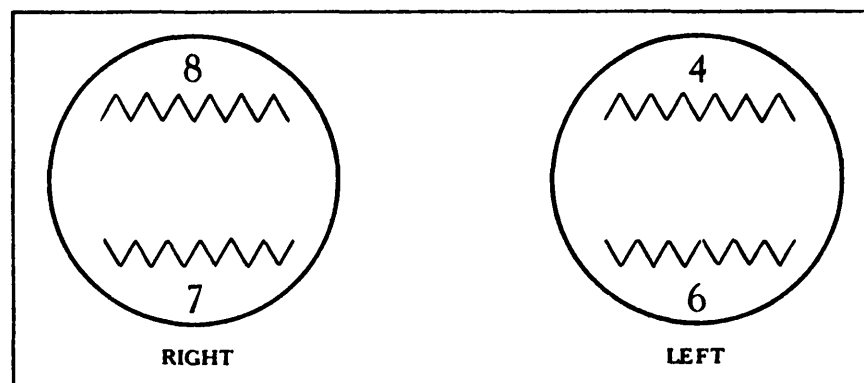


Fig. 2

The Filaments in the two Head Light Bulbs (as viewed from the front of car). The numbers designate the switch terminal number to which that filament should be connected.

This year we find two filament bulbs still being used; however, instead of the Mazda No. 1110, 21 c.p.-21 c.p. bulb, we find the Mazda No. 1116, 21 c.p.-32 c.p. bulb. In addition to this we find that the feed wire for each filament is carried all the way back to the lighting switch, and that various filament lighting combinations will result, depending upon the position of the lighting switch control lever. A representative switch is shown in Fig. 1. This is the Clum switch No. 9454, used on the 1933 Chrysler line of automobiles.

The following table lists the wires which should be connected to the numbered switch terminals,—

<i>Terminal Marked</i>		<i>Position Active</i>
1—Battery (switch feed)	—	1-2-3-4
2—Horn	—	
3—Park (side lights or auxiliary)	—	4
4—Upper Left Filament	—	1-2
5—Rear	—	1-2-3-4
6—Lower Left Filament	—	3
7—Lower Right Filament	—	2-3
8—Upper Right Filament	—	1

The following table lists the switch terminals which are connected together in the four switch positions,—

<i>Position</i>		<i>Terminals Connected</i>
④—Park	—	1-3-5
①—Depress	—	1-4-5-8
③—Pass	—	1-4-5-7
②—Driving	—	1-5-6-7

Figure 3 shows the lighting combinations for the various positions of the lighting switch.

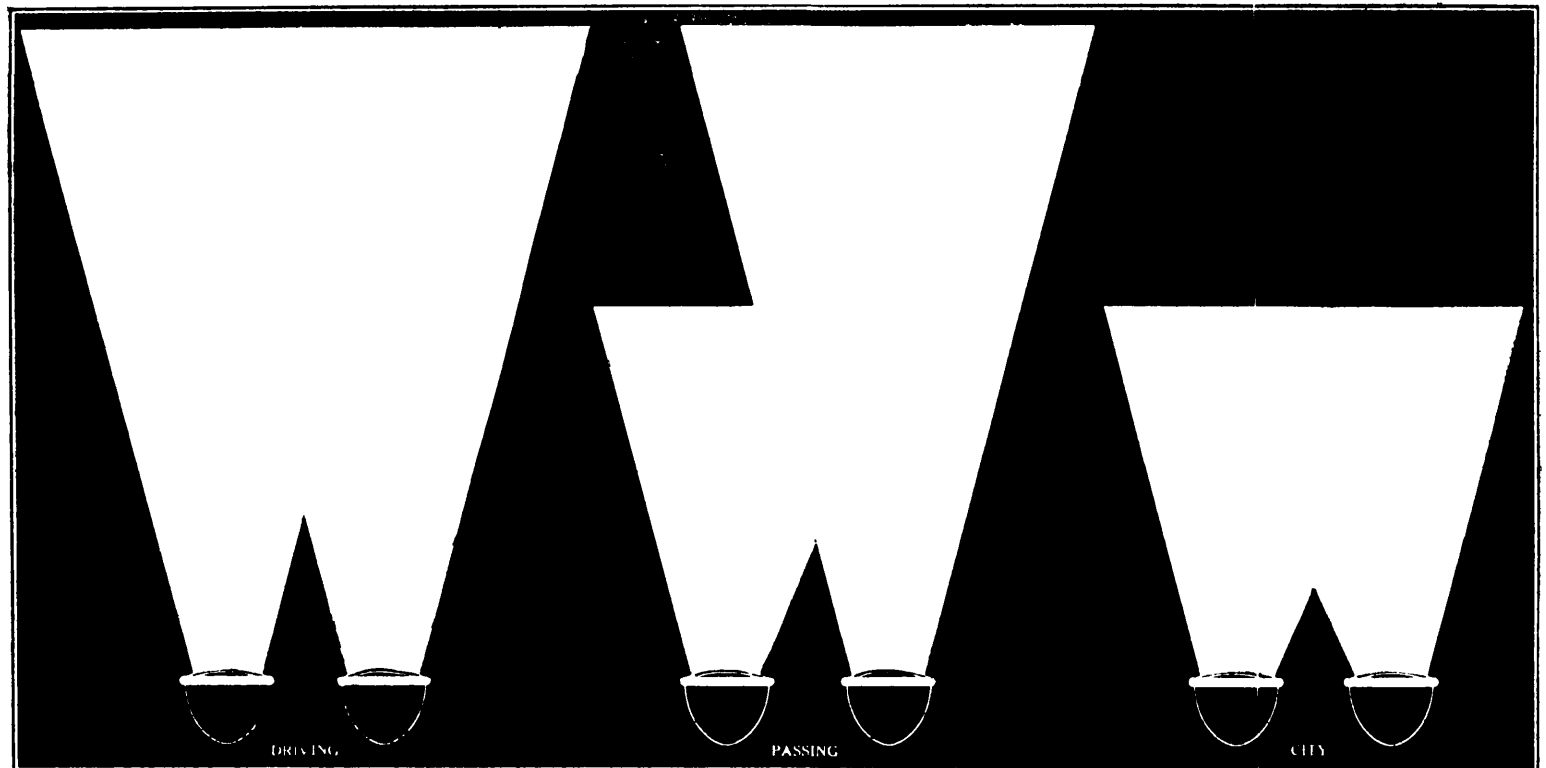


Fig. 3

Diagram showing lighting combinations on the 1933 Chrysler line of automobiles.

IMPORTANCE OF CORRECTLY ADJUSTED BREAKER POINT GAPS

The contact separation of any distributor has a direct bearing on the **TIMING OF THE SPARK**, the **effective saturation** period of the ignition coil, and the performance of the engine as a whole. While these facts have long since been generally recognized, modern distributor design now makes it imperative that special attention be given to the important detail of correctly adjusting breaker point gaps.

At the present time we find but two types of breaker arms used; first, the conventional arm, illustrated by Fig. 1, which is nothing more nor less than a third class lever, with the fulcrum at one end, the fibre cam follower (at which point motion is

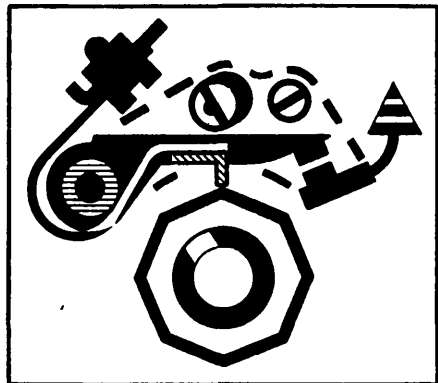


Fig. 1

A conventional Breaker Assembly with Contact Point at one end and Pivot at other.

imparted to the lever) somewhere between the two ends, usually about half way, and the contact point located at the other end. With this type of arm the distance thru which the contact end moves is approximately double the lift of the fibre cam follower. The second type arm is illustrated by Fig. 2. This breaker is, in reality, a first class lever, with the fulcrum between the two ends. When the fulcrum is located exactly half way between ends, a movement of .001 of an inch, imparted to the cam follower will result in an equal movement at the contact end. To explain the importance of correctly adjusted breaker point gaps and their relation to the ignition timing, we will refer to the second type breaker, as our readings will be direct and not subject to the two to one ratio of the first type. It is to be remembered, however, that what we are about to demonstrate with this type breaker would be exaggerated just twice as much with the conventional breaker.

By referring to Fig. 3 the effect of varying the contact gaps may be clearly understood. In this illustration the breaker points have just closed. The insert is a magnified section of the same breaker arm and cam. The dotted line "B" represents a true radius with its center at the center of the cam, and for a comparison its length indicates the time the contact points remain open. With a left hand rotating cam the breaker points would have started to open when the lobe of the cam came in contact with the fibre follower at the point indicated at the arrow "B".

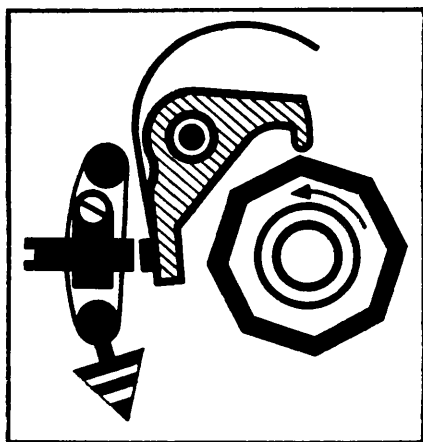


Fig. 2

The Mallory Breaker Assembly with Pivot half way between the Contact Point and Cam Follower.

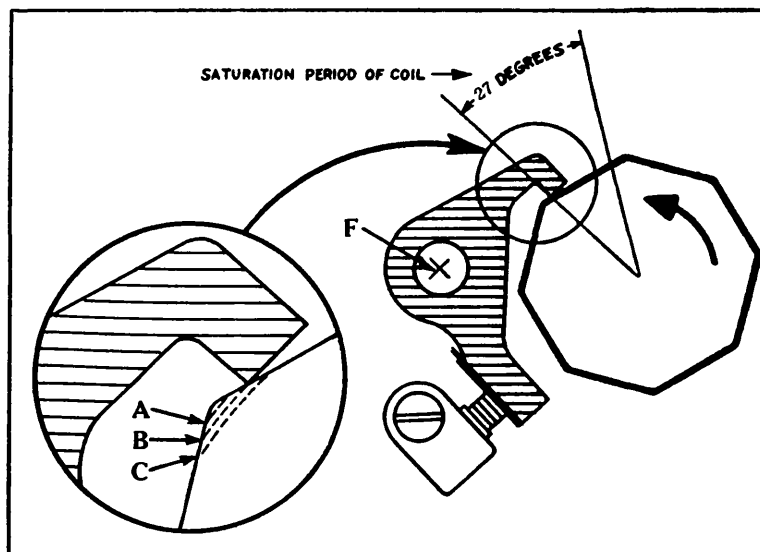


Fig. 3

Graphic representation of the effect of changing the contact separation, on engine timing, and saturation period of the Ignition Coil.

Since the distance from the breaker arm fulcrum point "F" to the cam follower is the same as the distance from the fulcrum to the breaker points (or, in other words, the lever has a ratio of one to one), the distance in thousandths of an inch from the line "B" to the crest of the cam lobe will be exactly the same as the contact separation of the breaker points. Assuming that this distance between line "B" and the crest of the cam is the correct amount; namely, .014 inch, the line "A" would represent the time the points would remain open were the cam follower worn down .007 inch which, of course, would result in only a .007 inch contact separation. Comparing the length of line "A" with that of line "B" it will be found to be but half as long and, also, the place

'A' where the breaker points now start to open is considerably BEHIND the place "B", where they started to open when correctly adjusted to a .014 inch gap.

In reality, this means that THE SPARK HAS BECOME RETARDED. The amount of the retard, in this instance, actually amounts to four degrees of flywheel travel which, of course, will result in a lowering of top speed, increased fuel consumption, with the resulting engine over-heating and excess oil consumption, as well as a lowering of engine efficiency in general. "C" on the cam represents the place where the breaker points would start to open were the points adjusted to a gap of .021 inch, or .007 inch more than the correct amount. "C" is considerably ahead of "B", and such an adjustment would, in effect, advance the spark four degrees of flywheel travel, causing a spark knock, and unsatisfactory engine performance. Remember that with the conventional two to one breaker arm, all of these discrepancies would be multiplied by two!

SATURATION PERIOD OF COILS.

Thus far in this explanation we have stressed the relationship between contact separation and ignition timing; however, there is still another important factor to be considered, and that is, the relationship between contact separation and the saturation period of the ignition coil. Bear in mind that every time a cam lobe passes under the fibre cam follower the breaker points are forced apart, and are held open throughout the interval which it takes the cam follower to go up over the crest of the cam, and down the other side.

As previously explained, the wider the contact separation, the earlier the points will open, and the later they will again close. Now, on a six cylinder engine using a six lobe cam, the lobes are sixty degrees apart, while on an eight cylinder engine using an eight lobe cam (a new type of distributor quite recently perfected and pretty universally used in 1933), they are forty-five degrees apart. Let us consider the eight cylinder job, in which we have but forty-five degrees to "play with". This forty-five degrees is divided up into two parts, a part during which the breaker points are OPEN, and a part during which the breaker points are CLOSED, which part, of course, determines the saturation period of the coil. Now, this is the important fact to constantly remember: IF WE INCREASE ONE PART the OTHER PART WILL BE CORRESPONDINGLY DECREASED. It has been found that the new eight cylinder, single breaker arm, eight lobe distributors give the best ignition results when the contact points are adjusted so that the points remain open thru 18 cam degrees, and closed thru 27 degrees (18 plus 27 equals 45). On a new distributor which has not suffered from wear, these intervals will result from a breaker contact separation of .016 inch, as accurately measured in the conventional way, by use of a thickness gauge.

An important fact, however, which soon must be recognized, is that it is now practically impossible to accurately set the breaker contact separation on these distributors by the use of a thickness gauge, because of the method now employed of changing the contact adjustments with an eccentric screw and movable plate. This, of course, is because the eccentric method is not as fine as the almost micro-adjustments which formerly could be made with the threaded contact point screw and lock nut, while, besides, it has been found that even an accurate adjustment on the modern distributors will be thrown out one or two thousandths either way, due to warpage when the mounting plate is finally locked in place by tightening the holding screws. This means that some other method must be employed if quick and accurate adjustments are to be made.

This method is to set the contact separations in a rotary spark gap graduated in degrees. At this time practically every first class electrical service station is equipped with a **Distributor Test Fixture**, or other device suitable for making these adjustments, and for your convenience you will find, in every case, **The Standard Auto-Electrician's Manual** is now specifying distributor contact separations, both in respect to the gap in thousandths of an inch (which, in reality, is only applicable to new distributors without wear), and in degrees thru which the cam should turn while the points are open. After making the adjustments by the graduated ring method it is always well to verify the contact separations with a thickness gauge, as too great a deviation from new equipment specifications is an indication of worn parts, especially a worn cam.

While the new, eight lobe, single arm distributors have practically replaced the single coil, double breaker arm, four lobe cam distributors which require synchronizing, there still are some 1933 cars equipped with them. These distributors, of course, are still adjusted and synchronized as in the past, by the use of the rotary spark gap and graduated disc, first setting the contact separations of both sets of breaker points to interrupt the primary circuit thru 56 degrees of cam travel (the 45 degrees thru which each set must remain open, plus the additional 11 degrees overlap), and then synchronizing the unit to interrupt the primary circuit accurately every 45 degrees of distributor shaft travel. If in doubt as to this procedure refer to Figure 2, Page 13, Section AA of this Manual (1927 Supplement).

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DISCONTINUED JULY, 1926.

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Generator, DC-4002	716
Generator, DD-4001	851
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DELCO (Delco-Remy after Jan. 1, 1927)

(If not listed under Delco look under Remy.)

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Generator, Model 247	615
Generator, Model 253	692
Generator, Model 256	808
Generator, Model 257	659
Generator, Model 258	875
Generator, Model 265	595
Generator, Model 269	771
Generator, Model 273	612
Generator, Model 279	879
Generator, Model 284	874
Generator, Model 285	1110
Generator, Model 287	608
Generator, Model 291	770
Generator, Model 295	699
Generator, Model 296	696
Generator, Model 300	880
Generator, Model 301	756
Generator, Model 303 (See AA Section)	
Generator, Model 308	768
Generator, Model 311	896
Generator, Model 312	756
Gen rator, Mod l 315	805
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G nerator, Model 319	946
G nerator, Mod l 325	741

Generator, Model 327	773
Generator, Model 331	858
Generator, Model 332	821
Generator, Model 333	794
Generator, Model 352	864
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Generator, Model 357	See AA Section
Generator, Model 363	892
Generator, Model 370	849
Generator, Model 373	861
Generator, Model 384	1007
Generator, Model 390	951
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Motor-Generator, Model 98	651
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Motor-Generator, Model 251	586
Motor-Generator, Model 268	650
Motor-Generator, Model 283	650
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Starter, Model 164	680
Starter, Model 181	808
Starter, Model 183	735
Starter, Model 185	682
Starter, Model 194	617
Starter, Model 200	823
Starter, Model 208	808
Starter, Model 228	609
Starter, Model 230	610
Starter, Model 240	668
Starter, Model 248	615
Starter, Model 252	879
Starter, Model 254	692
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Starter, Model 277	875
Starter, Model 278	721
Starter, Model 282	874
Starter, Model 286	768
Starter, Model 292	698
Starter, Model 297	780
Starter, Model 310	722
Starter, Model 313	858
Starter, Model 314	804
Starter, Model 316	803
Starter, Model 320	946
Starter, Model 321	896
Starter, Model 323	771
Starter, Model 326	773
Starter, Model 334	892
Starter, Model 336	880
Starter, Model 348	804
Starter, Model 349	806
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Generator, Model 917-A	792
Generator, Model 917-E	793
Generator, Model 917-J	643
Generator, Model 917-K	611
Generator, Model 917-L	640
Generator, Model 917-R	718
Generator, Model 917-S	772
Generator, Model 917-T	655
Generator, Model 917-U	686
Generator, Model 917-V	848
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Generator, Model 927-L	1145
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Generator, Model 927-S	1220
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Generator, Model 937-D	1227
Generator, Model 937-E	1225
Generator, Model 937-F	1226
Generator, Model 940-B	865
Generator, Model 940-C	859
Generator, Model 940-D	803
Generator, Model 940-E	799
Generator, Model 940-F	902
Generator, Model 940-G	922
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Generator, Model 941-B	836
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Generator, Model 941-J	746

Generator, Model 941-K	890
Generator, Model 941-L	963
Generator, Model 941-M	863
Generator, Model 941-P	872
Generator, Model 941-Q	726
Generator, Model 941-R	967
Generator, Model 941-S	857
Generator, Model 941-T	1046
Generator, Model 941-W	1006
Generator, Model 941-X	815
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Generator, Model 944-C	906
Generator, Model 944-D	907
Generator, Model 944-E	943
Generator, Model 944-F	907
Generator, Model 944-N	976
Generator, Model 945-B	817
Generator, Model 945-F	873
Generator, Model 945-Q	958
Generator, Model 945-U	1052
Generator, Model 945-Y	996
Generator, Model 947-A	814
Generator, Model 947-B	1090
Generator, Model 949-A	968
Generator, Model 949-B	882
Generator, Model 949-C	973
Generator, Model 949-D	812
Generator, Model 949-E	904
Generator, Model 949-F	1132
Generator, Model 949-G	862
Generator, Model 949-H	1155
Generator, Model 949-J	1026
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Generator, Model 949-Q	1045
Generator, Model 949-T	952
Generator, Model 949-U	964
Generator, Model 949-V	1097
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Generator, Model 951-C	731
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Gen rator, Model 957-B	1122
Generator, Model 957-C	1065
Gen rator, Model 957-E	1243
G nerator, Model 957-G	1170
G nerator, Mod l 957-J	1109
Gen rat r, Model 957-U	1108
Generator, M del 959-C	1062
Generator, M del 959-D	1043
Generator, Mod l 959-F	1088
Generator, Model 959-J	1081
Generator, Mod l 959-Z	1204
Generator, Model 965-L	1188
Generator, Model 965-M	1187
G n rator, Model 965-V	1245
Gen rator, Model 967-A	1229
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Starter, Mod l 712-A, B	693
Starter, Mod l 712-D	731
Start r, Mod l 712-F	909
Starter, Mod l 712-G	828
Start r, M del 712-H	922
Starter, Mod l 713-A	686
Starter, Model 713-B	772
Starter, Model 713-C	686
Starter, M del 713-F	871
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Starter, Model 713-J	812
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Starter, Model 714-A	746
Starter, Model 714-B	815
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Starter, Model 714-D	982
Starter, Model 714-E	859
Starter, Model 714-F	1019
Starter, Model 714-G	1097
Starter, Model 714-H	1139
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Start r, Model 714-N	1077
Starter, Model 714-P	1042
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Starter, Model 714-R	1147
Starter, Model 714-V	1122
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Starter, Model 717-A	905
Starter, Model 718-A	974
Starter, Model 718-E	1063
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Starter, Model 722-F	1098
Starter, Model 722-Q	1159
Starter, Model 723-A	793
Starter, Model 723-B	963
Starter, Model 723-C	1243
Starter, Model 724-C	911
Starter, Model 724-E	882
Starter, Model 724-H	964
Starter, Model 724-J	1034
Starter, Model 724-L	1055
Starter, Model 724-M	1020
Starter, Model 724-N	1109
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Starter, Model 725	849
Starter, Model 725-A	902
Starter, Model 725-C	1007
Starter, Model 725-D	1038
Starter, Model 725-G	1065
Starter, Model 725-H	1029
Starter, Model 725-K	1246
Starter, Model 725-L	1101
Starter, Model 725-N	1100
Starter, Model 725-Q	1168
Starter, Model 725-R	1154
Starter, Model 725-S	1163
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Starter, Model 725-V	1218
Starter, Model 725-W	1219
Starter, Model 725-Y	1261
Starter, Model 725-Z	1227
Starter, Model 726-A	947
Starter, Model 726-B	952
Starter, Model 726-C	1212
Starter, Model 726-E	1021
Starter, Model 726-F	1026
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Starter, Model 726-H	1138
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Starter, Model 728-B	1045
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Starter, Model 728-D	1102
Starter, Model 728-K	1169
Starter, Model 728-L	1170
Starter, Model 728-M	1271
Starter, Model 728-N	1108
Starter, Model 728-P	1220
Start r, Model 728-T	1229

Starter, Model 732-A, B	817
Starter, Model 732-C (same electrically as 732-A)	817
Starter, Model 734-A	1203
Starter, Model 734-B	1193
Starter, Model 734-G	1269
Starter, Model 734-H	1235
Starter, Model 734-K	1260
Starter, Model 734-L	1225
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Generator, Model EM-370	690
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Starter, Model EM-201	630
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Generator, Frame 35-AT, S-301190	665
Generator, Fr. 35-AT, S-313394-C	677
Generator, Frame 35-AT, S-366043	636
Generator, Fr. 35-ATI, S-355705	639
Generator, Fr. 36-DT, S-395228	635
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Generator, Frame 36-GT, S-416706	685
Generator, Frame 56-AT	605
Generator, Frame 57-GT, S-394498	625
Generator, Frame 57-GT, S-394958	626
Generator, Frame 57-GT, S-395031	628
Generator, Frame 571-R, S-416699	885
Generator, Frame 760	674
Generator, Frame 760, S-301190	600
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Starter, Frame 33-AB	677
Starter, Frame 33-AB, S-298808	684
Starter, Frame 33-AB, S-331236	598
Starter, Frame 59-AO, S-416662	685
Starter, Frame 100, S-286170	600
Starter, Frame 711	639
Starter, Frame 711, S-301210-B	719
Starter, Frame 711, S-331188	636
Starter, Frame 711, S-355527	635
Starter, Frame 711, S-382383	665
Starter, Frame 751	674
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Start r, Frame 777	694
Starter, Frame 778, S-382435	885
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725	AJAX	1925-26	21 51 (Early)	1000 and up	Auto-Lite MP-4101	Auto-Lite GTB-4004	Auto-Lite IG-4110
769		1926	21 51 (Late)	Known as Nash Light Six After June, 1926	Auto-Lite MN-4108	Auto-Lite GYA-4201	Auto-Lite IG-4110
638	ANDERSON	1922-25	Series, 40, 6-cyl.		Remy Mod. 705A, 722A	Remy Mod. 913A, B	Remy
639		1923-25	All	Production discontinued 1926	Westinghouse Frame 711	West. Frame 35 A TI	West. Type SC
640	APPERSON	1923-25	All 6 cyl.		Remy Model 720L	Remy Model 917L	Remy 366-V, 626-H
641		1923-25	All 8 cyl.		Bijur ED-160-M-1729B	Bijur L-220-M-1731	Remy
642		1925	Straight-Away Eight	Car production discontinued late 1925.	Remy 720-J	Remy 917-V	Remy 648-A
643	AUBURN	1923-25	6-63		Remy 720J	Remy 917J	Remy 626-H
644		1923-25	6-43		Remy 720J	Remy 922-A	Remy 366-N
645	Early	1925	8-63	(Standard combination switch on instrument board)	Remy 720-J	Remy 917-V	Remy 648-A
646	Late (Lycoming Eng. 2H)	1925	8-88	(Ign. Sw. concealed behind instrument board)	Remy 720-J	Remy 917-V	Remy 648-A
726	(Lycom. CF)	1926	4-44		Remy 714-A	Remy 941-Q	Remy 366-U
727	(Lycom. 4S)	1926	6-66	2555500 and up	Remy 720-J	Remy 941-D	Remy 636-F
728	(Lycom. 4H)	1926	8-88	2539200 and up	Remy 720-J	Remy 941-D	Remy 648-B
799	(Cont. 28L)	1927	6-66		Delco-Remy 714-E	Delco-Remy 940-E	Delco-Remy 637-W
800	(Lycom. GT)	1927	8-77		Delco-Remy 716-A	Delco-Remy 949-C	Delco-Remy 658-E
801	(Lycom. 4HM)	1927	8-88		Delco-Remy 720-Q	Delco-Remy 949-A	Delco-Remy 658-D
899	(Lycom. WS)	1928	6-76		Delco-Remy 716-C	Delco-Remy 949-C	Delco-Remy 641-A
900	(Lycom. GS)	1928	8-88		Delco-Remy 716-C	Delco-Remy 949-C	Delco-Remy 657-E
901	(Lycom. MD)	1928	115		Delco-Remy 718-A	Delco-Remy 949-A	Delco-Remy 657-D
972	(Lycom. WR)	1929	6-80	2948001 and up	Delco-Remy 716-C	Delco-Remy 949-C	Delco-Remy 641-A
973	(Lycom. GR)	1929	8-90	2948001 and up	Delco-Remy 716-C	Delco-Remy 949-C	Delco-Remy 657-E
974	(Lycom MDA)	1929 1930	120 125	2948001 and up 125A-1001 and up	Delco-Remy 718-A	Delco-Remy 955-J	Delco-Remy 657-L
1035	(Lycom. WR)	1930	6-85	685A-1001 and up	Delco-Remy 716-C	Delco-Remy 955-H	Delco-Remy 641-F
1036	(Lycom. GR)	1930	8-95	695B-1001 and up 695F-1001 and up	Delco-Remy 716-C	Delco-Remy 955-H	Delco-Remy 657-P
1098	(Lycom. GU)	1931	Standard 8-98 Custom 8-98-A	8-98-1001 and up 8-98-A-1001 and up	Delco-Remy 722-F	Delco-Remy 955-H	Delco-Remy 660-Z
1159		1932	8-100 Straight Eight	8100-1001 and up	Delco-Remy 722-Q	Delco-Remy 955-H	Delco-Remy 660-Z
1160		1932	12-160 "Vee" 12	12160-1001 and up	Delco-Remy 543	Delco-Remy 931-E	Delco-Remy 667-Z
1216	AUBURN	1933	8-101 Standard & Custom 8-105 Salon Series Straight Eights	8-101-1001 and up 8-105-1001 and up	Delco-Remy 736-E	Delco-Remy 955-H	Delco-Remy 660-Z
1217		1933	12-165 "Vee" 12	12-165-1001 and up	Delco-Remy 543	Delco-Remy 931-F	Delco-Remy 667-Z
1099	AUSTIN	1931	American	9201 and up	Auto-Lite MAK-4001	Auto-Lite GAS-4101	Auto-Lite IGB-4034-A
1161		1932-33	4 cyl.		Auto-Lite MAK-4001	Auto-Lite GAS-4101	Auto-Lite IGB-4034-A

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583	BARLEY	1923-24	6Y Cont. Eng.		Delco Model 208	Delco Model 257	Delco
584		1924	Special	Production discontinued 1925	Wagner, S-487	Wagner, S-488A	Wagner
585	BAY STATE	1923-24			Delco, Mod. 181	Delco Mod. 258	Delco
647		1925	Mod. 1 & 2 6 cyl.	2151 and up	Amer. Bosch Type 942	Amer. Bosch Type 1047	Amer. Bosch
648		1925	Mod. 3 Straight Eight	Car production discontinued late 1925	Amer. Bosch Type 942	Amer. Bosch Type 1262	Amer. Bosch Type 8202
975	BLACK HAWK	1929-30	6 cyl.	30001 and up	Delco-Remy 726-C	Delco-Remy 949-H	Delco-Remy 4043
976		1929-30	8 cyl.	28001 and up Production discontinued 1931	Delco-Remy 724-J	Delco-Remy 944-N	Delco-Remy 658-U
649	BREWSTER	1917-25	41 4-cyl.	Serial Motor Numbers on plate on the motor side of dash. Car production discontinued late 1925	USL	USL	Magneto
586		1924	4 cyl.		Delco MG Model No. 251	Delco MG Model No. 251	Delco
587	BUICK	1924	6 cyl.		Delco MG 268	Delco MG 268	Delco
650		1925	Standard Six Master Six	1253555 and up 1315305 and up	Delco MG Models 268, 283	Delco MG Models 268, 283	Delco Integral Gen.
802		1926	Master Six Standard Six	1412093 and up 1398244 and up	Delco Model 316	Delco Model 317	Delco No. 17046
802 (Early)		1927	115 120-128	1638800 up to 1836966 161435 up to 1849899	Delco Model 316	Delco Model 317	Delco No. 17046
803 (Lat)		1927	115 120-128	1836966 and up 1849899 and up	Delco Model 316	Delco-Remy 940-D	Delco No. 17046
902		1928	115 120-128		Delco-Remy 725-A	Delco-Remy 940-F	Delco-Remy 640-A
977		1929	116-121-129		Delco-Remy 725-D	Delco-Remy 940-M	Delco-Remy 640-J
1037		1930	40		Delco-Remy 725-D	Delco-Remy 940-M	Delco-Remy 640-Y
1038		1930	50-60		Delco-Remy 725-D	Delco-Remy 940-M	Delco-Remy 650-B
1100		1931	8-50 Straight Eight	2460544 and up	Delco-Remy 725-N	Delco-Remy 940-T-3	Delco-Remy 660-L
1101		1931	8-60, 8-80, 8-90 Straight Eights	2467004 and up 2477656 and up 2482489 and up	Delco-Remy 725-L	Delco-Remy 940-T-2	Delco-Remy 660-E
1162		1932	32-50 Straight Eight	2602732 and up	Delco-Remy 725-T	Delco-Remy 940-T	Delco-Remy 660-L
1163		1932	32-60, 32-80, 32-90 Straight Eights	2602732 and up	Delco-Remy 725-S	Delco-Remy 940-T	Delco-Remy 662-B
1218		1933	33-50 Straight Eight	2659523 and up	Delco-Remy 725-V	Delco-Remy 956-B	Delco-Remy 661-L
1219		1933	33-60, 33-80, 33-90 Straight Eights	2659523 and up	Delco-Remy 725-W	Delco-Remy 956-B	Delco-Remy 661-K
651	CADILLAC	1924-25	V-63		Delco MG Model No. 98	Delco MG Model No. 98	Delco No. 5239
804		1926-27	314 1st Series	100001 and up Before chassis 1-29675	Delco Model 348, 314	Delco Model 315	Delco No. 4011, 5281
805		1927	314 2nd Series	After Chassis 1-29675 Before Engine 1-41001	Delco Model 349	Delco Model 315	Delco No. 4016
806		1927	314 3rd Series	After Engine 1-41001	Delco Model 349	Delco-Remy 370	Delco-Remy No. 4023
903		1928	341		Delco-Remy 382	Delco-Remy 384	Delco-Remy 4032
978		1929	341-B		Delco-Remy 382	Delco-Remy 384	Delco-Remy 4041-4042
1039		1930	353 8 cyl.	500001 and up	Delco-Remy 728-D	Delco-Remy 927-D	Delco-Remy 4050-4055 4056
1040		1930	452 16 cyl.	700001 and up	Delco-Remy 457	Delco-Remy 927-E	Delco-Remy 4057
1102		1931	355-A "V8"	800001 and up	Delco-Remy 728-D	Delco-Remy 927-D	Delco-Remy 4055
1103		1931	370-A "V12"	1000001 and up	Delco-Remy 457	Delco-Remy 927-K	Delco-Remy 4069

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Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
1104		1931	452-A "V16"		Delco-Remy 457	Delco-Remy 927-K	Delco-Remy 4057
1164		1932	355-B "V8"	1200001 and up	Delco-Remy 728-P	Delco-Remy 927-S	Delco-Remy 660-Y
1165		1932	370-B "V12"	1300001 and up	Delco-Remy 495	Delco-Remy 931-D	Delco-Remy 4092
1166		1932	452-B "V16"	1400001 and up	Delco-Remy 495	Delco-Remy 931-D	Delco-Remy 4093
1220		1933	355-C "Vee" 8	3000001 and up	Delco-Remy 728-P	Delco-Remy 927-S	Delco-Remy 662-Y
1221		1933	370-C "Vee" 12	4000001 and up	Delco-Remy 495	Delco-Remy 931-D	Delco-Remy 4110
1222		1933	452-C "Vee" 16		Delco-Remy 495	Delco-Remy 931-D	Delco-Remy 4111
CASE				Serial Number on dash. (Continental Motor.)			
652	(Cont. 6J)	1925	Y-Big Six	44444 and up	Delco Model 200	Delco Model 256	Delco 5208
807	(Cont. 6J)	1926-27	Y		Delco Model 200	Delco Model 258	Delco Model 5208
808	(Cont. 8R)	1923-27	W, X, Y J.I.C.	Car production discontinued early 1927	Delco Models 181, 208	Delco, Models Model 256, 258	Delco 5251, 5252, 5256
CHANDLER							
588		1923-24			Amer.-Bosch Model 935	Amer.-Bosch 1046	Amer.-Bosch Type FL-635
653		1925	32-A	147001 and up	Amer. Bosch Type 935	Amer. Bosch Type 1059	Amer. Bosch T-6272
729		1926	35	159625 and up	Amer. Bosch Type 959	Amer. Bosch Type 1070	Amer. Bosch Type T-6272
809		1927	Standard Six 31	15598 and up	Delco-Remy 717-A	Delco-Remy 939-E	Delco-Remy 637-V
810		1927	Big Six 35	174001 and up	Delco-Remy 720-W	Delco-Remy 944-C	Delco-Remy 637-X
811		1927	Royal Straight Eight 37	100001 and up	Delco-Remy 727-A	Delco-Remy 944-D	Delco-Remy 658-G
812		1927	Special Six 43	77526 and up	Delco-Remy 713-J	Delco-Remy 939-D	Delco-Remy 637-U
904		1928	Invincible Six		Delco-Remy 717-A	Delco-Remy 949-E	Delco-Remy 633-B
905		1928	Special Six		Delco-Remy 717-A	Delco-Remy 949-E	Delco-Remy 633-B
906		1928-29	Big Six		Delco-Remy 727-A	Delco-Remy 944-C	Delco-Remy 633-C, 641-C
907		1928-29	Royal Straight Eight 8-85		Delco-Remy 727-A	Delco-Remy 944-D, F	Delco-Remy 657-A, F
979		1929	65		Auto-Lite MZ-4015	Auto-Lite GAL-4115	Auto-Lite IGB-4018
980		1929	6-75	Production discontinued 1929	Auto-Lite MAD-4103	Auto-Lite GAG-4113	Auto-Lite IGH-4001-A
CHEVROLET				Serial Number on Front Seat Heel Board. Motor Number stamped on Block Rear Distributor.			
589		1923-24	Superior Line		Remy Model 711-B	Remy Model 950-A, B	Remy 366-P
654		1925	K	Note:—Starting Motor 711-BX (four brushes) has same electrical characteristics as Motor 711-B used in 1924.	Remy 711-BX	Remy 950-B	Remy 366-P
730		1926	K		Remy 710-C	Remy 943-B	Remy 374-A
813		1927	Capitol AA		Delco-Remy 710-D	Delco-Remy 943-B	Delco-Remy 374-A
908		1928	AB National		Delco-Remy 710-D	Delco-Remy 943-B	Delco-Remy 635-B
981		1929	Series AC 6 cyl.	AC-1000 and up	Delco-Remy 714-L	Delco-Remy 943-J	Delco-Remy 633-G
1105		1930 1931	Series AD 6 cyl. Series AE 6 cyl.	AD-1001 and up AE 1001 and up	Delco-Remy 714-L	Delco-Remy 943-J	Delco-Remy 633-G
1167		1932	Confederate Series BA	Ba 1001 and up	Delco-Remy 714-L	Delco-Remy 943-J	Delco-Remy 633-J
1223		1933	Eagle Series CA, 6 cyl.	CA-1001 and up	Delco-Remy 714-L	Delco-Remy 943-J	Delco-Remy 644-D
1224		1933	"Mercury" Standard Line Series CC, 6 cyl.	CC-1001 and up	Delco-Remy 714-L	Delco-Remy 943-J	Delco-Remy 622-L

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Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
CHRYSLER							
590		1924	Six		Remy Model 722B	Remy Model 917T	Remy 616-F
655		1925	B	1001 and up	Remy 722-B	Remy 917-T	Remy 656-B
731		1926	4-F (58)	WW-100W and up	Remy 712-D	Remy 951-C	Remy 634-A
732		1926	6-G (70)		Remy 724-C	Remy 941-C	Remy 656-B
814		1927	50		Delco-Remy 712-F	Delco-Remy 947-A	Delco-Remy 638-B-638-C
815		1927	60		Delco-Remy 714-B-714-D	Delco-Remy 941-X	Delco-Remy 637-J-637-N
816		1927	70		Delco-Remy 724-C	Delco-Remy 941-C	Delco-Remy 656-B-656-F
817		1926-27	80	EW000W and up	Delco-Remy 732-A, 732-B	Delco-Remy 945-B	Delco-Remy 656-C, D, E
909		1928	62		Delco-Remy 712-F	Delco-Remy 947-B	Delco-Remy 630-A
910		1928	62		Delco-Remy 714-D	Delco-Remy 949-L	Delco-Remy 631-B
911		1928	72		Delco-Remy 724-C	Delco-Remy 949-L	Delco-Remy 659-B
912		1928-29	80 Imperial		Delco-Remy 728-A	Delco-Remy 949-Q	Delco-Remy 659-B
982		1929	65	Starting July 1928 LS-400P and up	Delco-Remy 714-D	Delco-Remy 943-H	Delco-Remy 639-X
983		1929	75	Starting July 1928 CY-050P and up	Delco-Remy 728-B	Delco-Remy 955-F	Delco-Remy 659-B
1041		1930	Little Six		Delco-Remy 714-Q	North East LAB-6530	North East THU-1229
1042		1930	66	Starting Aug. 1929 H-001 WP and up	Delco-Remy 714-P	Delco-Remy 943-H	Delco-Remy 639-X
1043		1930	70	Starting Jan. 1930 P-117-PV and up	Delco-Remy 714-P	Delco-Remy 959-D	Delco-Remy 639-X
1044		1930	77	Starting Aug. 1929 C-001 WP and up	Delco-Remy 728-B	Delco-Remy 959-D	Delco-Remy 659-B
1045		1930	80 Imperial	Starting Aug. 1929 EP 542C and up	Delco-Remy 728-B	Delco-Remy 919-Q	Delco-Remy 659-B
1106		1931	CM 6 cyl.	Starting July, 1930 6514920 and up	Delco-Remy 725-Q	Delco-Remy 943-R	Delco-Remy 632-K
1107		1930-31	CD Straight Eight	Starting July, 1930 7500001 and up	Delco-Remy 728-K	Delco-Remy 943-R	Delco-Remy 660-G
1108		1931	CG Imperial St. Eight	Starting July, 1930 7800001 and up	Delco-Remy 728-N	Delco-Remy 957-U	Delco-Remy 660-S
1168		1932	CI 6 cyl.	Starting Jan. 1, 1932 6557401 and up	Delco-Remy 725-Q	Delco-Remy 943-S	Delco-Remy 632-L
1169		1932	CP Straight Eight	Starting Jan. 1, 1932 7523601 and up	Delco-Remy 728-K	Delco-Remy 943-S	Delco-Remy 661-G
1170		1932	CL Imperial St. Eight	Starting Jan. 1, 1932 7803301 and up	Delco-Remy 728-L	Delco-Remy 957-G	Delco-Remy 661-F
1225		1933	CO 6 cyl. (Early)	6576001 and up	Delco-Remy 734-L	Delco-Remy 937-E or 943-S	Delco-Remy 622-C
1226		1933	CO 6 cyl. (Late)		Delco-Remy 734-R	Delco-Remy 937-F or 937-D	Delco-Remy 644-L
1227		1933	CT Straight Eight	7000001 and up	Delco-Remy 725-Z	Delco-Remy 937-D or 937-F	Delco-Remy 661-R
1228		1933	CQ Imperial St. Eight	7529001 and up	Delco-Remy 725-Z	Delco-Remy 937-F or 937-D	Delco-Remy 661-T
1229		1933	CL—Custom Imperial St. Eight	7803551 and up	Delco-Remy 728-T	Delco-Remy 967-A	Delco-Remy 661-U
CLEVELAND							
				Serial Number on right hand front frame horn. (Own Motor.)			
591		1923-24	48		Amer.-Bosch Mod. 900	Amer.-Bosch Mod. 1000	Amer.-Bosch
656		1925	81		Amer. Bosch Type 955	Amer. Bosch Type 1060, 1069	Amer. Bosch
733		1926	Standard (31)	C-4189 and up	Amer. Bosch Type 970	Amer. Bosch Type 1069	Amer. Bosch T-6600
734		1924-26	Special (43)	70483 and up 60000 and up	Amer. Bosch Type 943	Amer. Bosch Type 1052, 1068	Amer. Bosch T-6206, T-6230
NAME CHANGED TO CHANDLER, JANUARY 1, 1927							
COLE							
				Serial Number under driver's seat cushion, or on right front end of frame. (Own Motor.)			
657		1920-25	870 to 886 890	60000 and up Car production discontinued in 1925	Delco Mod. 72, 259	Delco Model, 153	Delco No. 5194

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Page	Name of Car	Year	Model	Serial Number and Location	Start r	Generator	Ignition
592	COLUMBIA	1922-24	Light Six	Production discontinued 1925	Auto-Lite Mod. MH, MG-4003	Auto-Lite Model GJ GP 4001	Auto-Lite
	CONTINENTAL			Serial Number on right side floor board on all models. Motor Number on left side crank case.			
1230		1933	40, "Beacon" 4 cyl.	C40-1001 and up	Auto-Lite MZ-4034	Auto-Lite GAM-4505	Auto-Lite IGB-4201
1231		1933	60, "Flyer" 6 cyl.	C60-1001 and up	Auto-Lite MZ-4034	Auto-Lite GAM-4505	Auto-Lite IGB-4083
1232		1933	81, "Ace" 6 cyl.	81-1001 and up	Auto-Lite MAB-4037	Auto-Lite GAL-4330	Auto-Lite IGB-4084
1046	CORD (Lycom. FDA)	1930	L-29	2925001 and up	Delco-Remy 724-N	Delco-Remy 941-T	Delco-Remy 658-W
1109	(Lycom. FDA)	1931-32	L-29 Straight Eight	2928720 and up Starting Jan. 1, 1932, 2930154 and up Production discontinued 1932	Delco-Remy 724-N	Delco-Remy 957-J	Delco-Remy 658-W
	CUNNINGHAM			Serial Number on left frame member rear radiator. Motor number on left front motor arm. (Own motor.)			
593		1920-24	V-4-2 8-cyl.	2451 to 3000	Delco Model 183	Delco Model 182	Delco No. 2162
658		1925	V-4		Delco Model 183	Delco Model 285	Delco No. 5218
735		1925-26	V-6		Delco Model 183	Delco Model 285	Delco No. 5218
818		1927-29	V7 V8		Delco Model 350	Delco Model 285	Delco No. 5299
1047		1930	V-9		Delco-Remy 350	Delco-Remy 285	North East TEU-10874
1110		1931-32	V-9 V-10	Pleasure Car production discontinued 1932	Delco-Remy 350	Delco-Remy 285	North East TEU-10874
736	DAGMAR (Cont. 6J)	1925-26	6-60 6-70	1588 and up	Delco Model 181, 200	Delco Model 258	Delco Model 5208
737	(Lycom. 2S)	1926	6-60	Production discontinued 1927	Auto-Lite MN-4102	Auto-Lite AJ-4110	Auto-Lite IG-4118
	DAVIS			Serial Number and Motor Number treated as one, on left side crank case. (Continental motor.)			
659	(Cont. 7U)	1923-25	Sport Series 70 90		Delco Models 240, 286	Delco Models 257, 303	Delco Integral Gen.
660	(Cont. 8R)	1925	91		Delco Model 181	Delco Model 258	Delco No. 5275
738	(Cont. 11U)	1926	92	13101 and up	Delco Model 313	Delco Model 325	Delco No. 5294
739	(Cont. 20L)	1926	93	15269 and up	Delco Model 313	Delco Model 325	Delco No. 5294
819	(Cont. 11U)	1927	Big Six 92-27	20169 and up	Delco Model 313	Delco Model 332	Delco No. 5294
820	(Cont. 28L)	1927	Light Six 94-27	25302 and up Production discontinued 1928	Delco Model 313	Delco Model 332	Delco No. 5294
984	DE SOTO	1929	Early	KW-000-P and up	Delco-Remy 714-J	Delco-Remy 943-H	Delco-Remy 631-C
985		1929	Late		North East SBH-6534	North East LAB-6530	North East TBU-10849
1048		1930	Six	Starting Aug. 1929 KLS00E and up	Delco-Remy 714-Q	North East LAB-6530	North East TBU-10849
1049		1930	Eight	Starting Jan. 1930 LOO1 WP and up	Delco-Remy 714-Q	North East LAB-6530	Delco-Remy 660-D
1111		1931	SA 6 cyl.	5011801 and up	Delco-Remy 725-Q	Delco-Remy 943-R	Delco-Remy 632-K or L
1112		1931	CF Straight Eight	6000801 and up L185PH and up	Delco-Remy 714-Q	Delco-Remy 943-R	Delco-Remy 660-D
1171		1932	SC 6 cyl.	Starting Jan. 9, 1932 5040201 and up	Delco-Remy 725-Q	Delco-Remy 943-S	Delco-Remy 632-L
1233		1933	SD 6 cyl. (Early)	5056001 and up	Delco-Remy 734-L	Delco-Remy 943-S or 937-E	Delco-Remy 622-C
1234		1933	SD 6 cyl. (Late)		Delco-Remy 734-R	Delco-Remy 937-D or 937-F	Delco-Remy 644-J
1113	DE VAUX	1931-32	6-75 6 cyl.	Production discontinued 1932	Auto-Lite MAB-4037	Auto-Lite GAL-4330	Auto-Lite IGB-4031-A

STANDARD AUTO-ELECTRICIAN'S MANUAL

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Page	Name of Car	Year	Model	Serial Number and Locatl n	Starter	Generator	Ignition
	DIANA						
	(Cont. 12Z)	Lat 1925 Early 1926	Straight Eight	32300 and up	Delco Model 313	Delco Model 325	Delco No. 5282
	(Cont. 12Z)	1926	Straight Eight	80001 and up	Delco Model 313	Delco Model 325	Delco No. 5287
821	(Cont. 12Z)	1927-28	Straight Eight	Production discontinued 1928	Delco Model 313	Delco Model 332	Delco No. 5293
	DODGE BROS.						
661		1923-25			North East S-G Md. GA, Type 3804	North East S-G Md. GA, Type 3804	North East Mod. O, Type 10004
742	(Early)	1926	12 volt, single unit system	A-872-475 and up	NorthEast MG Model GA Type 3804-A	NorthEast Model GA Type 3804-A	NorthEast Model O Type 10004
743	(Lat)	1926	6 volt, two unit system		NorthEast Type 6304 Type 6304-A	NorthEast Type 6334	NorthEast TU-10786
822		1927	4 cyl.	A-702243 and up	North East Model SBH Type 6304	North East Model LR Type 6334	North East Model TU Type 10786
913		1928	Late 1927-Early 1928 4 cyl.		North East Model SBH Type 6404	North East Model LB Type 6384-A	North East Model TU Type 10826
914		1928	Senior Six		North East Model SBH Type 6400	North East Model LB Type 6390-A	North East Model TU Type 10836
915		1928	Victory Six		North East Model SBH Type 6404	North East Model LB Type 6390-A	North East Model TU Type 10846
916		1928	Standard Six		North East Model SBH Type 6404	North East Model LB Type 6390-A	North East Model TU Type 10846
986		1929	Six	DA-1 and up	North East SBH-6494	North East LAB-6530	North East TBU-10845
987		1929	Senior Six	S-50001 and up	North East SBH-6400	North East LB-6390-A	North East TBU-10846-A
1050		1930	DD 6 cyl.	D-001 WP and up	Delco-Remy 714-Q	North East LAB-6530	North East TBU-10849
1051		1930	DC Straight Eight	E-001 WC and up	Delco-Remy 714-Q	North East LAB-6530	Delco-Remy 660-B
1114		1931	DH 6 cyl.	Starting Dec. 1, 1930 3518001 and up	Delco-Remy 725-Q	Delco-Remy 943-R	Delco-Remy 632-K
1115		1931	DG Straight Eight	4508001 and up	Delco-Remy 728-K	Delco-Remy 943-R	Delco-Remy 660-G
1172		1932	DL 6 cyl.	Starting Jan. 8, 1932 3558101 and up	Delco-Remy 725-Q	Delco-Remy 943-S	Delco-Remy 632-L
1173		1932	DK Straight Eight	Starting Jan. 8, 1932 4520101 and up	Delco-Remy 728-K	Delco-Remy 943-S	Delco-Remy 661-D
1235		1933	DP 6 cyl. (Early)	3579001 and up	Delco-Remy 734-H	Delco-Remy 943-S or 937-E	Delco-Remy 622-H
1236		1933	DP 6 cyl. (Late)		Delco-Remy 734-H	Delco-Remy 937-E or 943-S	Delco-Remy 644-K
1237		1933	DO (Early) Straight Eight	4527001 and up	Delco-Remy 725-Z	Delco-Remy 937-D or 937-F	Delco-Remy 661-D
1238		1933	DO (Late) Straight Eight		Delco-Remy 725-Z	Delco-Remy 937-F	Delco-Remy 661-S
	DORRIS						
662		1921-25	6-80, 6-cyl.	Car production discontinued	Westinghouse Frame 751	Westinghouse Frame 760	Bosch Magneto, DU-6
	DORT			Serial Number on Dash under hood.			
663		1924-25	Six	Car production discontinued early 1925	American Bosch Type 525	American Bosch Type 651-653	American Bosch
	DUESENBERG						
664		1922-25	Straight Eight	Series 601 and up	Delco Model 200	Delco Model 242	Delco
823		1926-28	Straight Eight	1500 and up	Delco Model 200	Delco Model 242	Delco No. 17023
988		1929-33	J Straight Eight	2000 and up	Delco-Remy 429	Delco-Remy 428	Delco-Remy 4044, 4094
	DUPONT			Serial Number on rear of Dash. (Own Motor.)			
665		1923-25	C		West. Frame 711, Style 382383	West. Frame 35 AT Style 301190	West. S-250358-C
744	(Wis. Y)	1926	D		Amer. Bosch Type 930	Amer. Bosch Type 1047	Amer. Bosch
824	(Wis. Y)	1927-28	E	E-520 and up	Amer. Bosch Type 963	Amer. Bosch Type 1047	Amer. Bosch TM-662
1052		1930	Model G Straight Eight		Delco-Remy 720-X	Delco-Remy 945-U	Delco-Remy 658-A

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Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
DURANT							
594		1922-24	A-22		Auto-Lite MF	Auto-Lite GH	Auto-Lite
745	(Cont. Spec'l)	1925-26	A-22	100000 and up	Auto-Lite MF-1096	Auto-Lite GH-1036	Auto-Lite IG-4018
917	(Cont. W-5)	1928	M-2 4 cyl.		Auto-Lite MO-4102	Auto-Lite GAL-4105	Auto-Lite IGE-4005A
918	(Cont. 14-L)	1928	D-55		Auto-Lite MO-4102	Auto-Lite GT-4001A	Auto-Lite IG-4067A
919	(Cont. 15-L)	1928	D-65		Auto-Lite MZ-4001	Auto-Lite GT-4102	Auto-Lite IGB-4007-A
920	(Cont. 15-U)	1928	D-75		Auto-Lite MAD-4101	Auto-Lite GA-4101	Auto-Lite IGB-4008A
989	(Cont. W-5)	1929	40	1001 and up	Auto-Lite MZ-4012	Auto-Lite GAL-4105	Auto-Lite IGB-4019-A
990	(Cont. 14-L)	1929	D-60		Auto-Lite MZ-4012	Auto-Lite GAL-4104, 4107	Auto-Lite IGB-4001-B
1053	(Cont. 22-A)	1930	6-14	1001 and up	Auto-Lite MAJ-4001	Auto-Lite GAL-4130	Auto-Lite IGB-4031
1054	(Cont. 15-U)	1930	6-17	1001 and up	Auto-Lite MAD-4101	Auto-Lite GAK-4101 or GAK-4103	Auto-Lite IGB-4036-A
1116		1931-32	610 4 cyl.	Starting Jan. 1, 1931 L-2001 and up	Auto-Lite MAJ-4007	Auto-Lite GAL-4130	Auto-Lite IGB-4043
1117		1931-32	612 and 614 6 cyl.	L-2001 and up L-3001 and up Production discontinued 1932	Auto-Lite MAJ-4001	Auto-Lite GAL-4330	Auto-Lite IGB-4031-A
ELCAR				Serial Number on dash. (Continental Motor for 6 cylinder cars, Lycoming Motor for 4 cylinder cars.)			
595		1923-24	4-40 Lycoming Motor		Delco Model 263	Delco Model 26	Delco No. 5261
666		1924-25	6-50		Auto-Lite MG-4003	Auto-Lite GP-4007	Auto-Lite IG-4039A
667	(Lycoming CF)	1925	4-44		Auto-Lite MN-4004	Auto-Lite GJ-4101	Auto-Lite IG-4051A
668	(Lycoming H)	1925	8-80		Delco Models 240, 313	Delco Model 256	Delco No. 5286
669	Late Ea-ly	1924 1925	6-60 6-60 - 6-61		Delco Model 181	Delco Model 258	Delco 5256
746	(Lycom. CF)	1926	4-55		Remy 714-A	Remy 941-J, 941-Q	Remy 366-U
747	(Lycom. S)	1926	6-65		Remy 720-J	Remy 941-D	Remy 636-H
748	(Lycom. 4H)	1926	8-81		Remy 720-J	Remy 941-D	Remy 648-A
825	(Lycom. WT)	1927-28	6-70		Delco-Remy 716-A	Delco-Remy 949-C	Delco-Remy 636-S
826	(Lycom. GT)	1927-28	8-82		Delco-Remy 716-A	Delco-Remy 949-C	Delco-Remy 658-B
827	(Lycom. 4HM)	1927-28	8-90 8-91, 8-92		Delco-Remy 720-Q	Delco-Remy 949-A	Delco-Remy 658-A
921	(Lycom. GT)	1928	8-78		Delco-Remy 716-A	Delco-Remy 949-C	Delco-Remy 658-B
991		1929-31	6-75	A7L-36 and up	Delco-Remy 716-A	Delco-Remy 955-H	Delco-Remy 631-D, E
992		1929-31	95-96	A7L-36 and up	Delco-Remy 716-A	Delco-Remy 955-H	Delco-Remy 651-B, C
993		1929-30	120 130-140	A7L-36 and up Production discontinued 1931	Delco-Remy 720-Y	Delco-Remy 955-K	Delco-Remy SM-1032
596	ELGIN	1924	The New Elgin	Production discontinued 1925	De'Jon SA 4002	De'Jon DB 4001	De'Jon IA-4002
828	ERSKINE	1927	Six	Serial Number on Left Side of frame under front fender.	Delco-Remy 712-G	Delco-Remy 942-B	Delco-Remy 637-Y
922	(Cont. 9-F)	1928-29	51-F		Delco-Remy 712-H	Delco-Remy 940-G	Delco-Remy 639-R
1055		1930	58	Starting Dec. 1929 5073001 and up Production discontinued 1931	Delco-Remy 724-L	Delco-Remy 955-U	Delco-Remy 639-J
ESSEX							
597		1924	Essex Six		American Bosch Type 940	American Bosch Type 1043	American Bosch T-6200
670		1925	6 cyl.		Amer. Bosch Type 944, 946, 948	Amer. Bosch Type 1067	Amer. Bosch T-6200
749		1926	6 cyl. (Early)		Amer. Bosch Type 964	Amer. Bosch Type 1067	Amer. Bosch Type T-6200

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Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
750		1926	6 cyl. (Late)		Amer. Bosch Type 964	Amer. Bosch Type 1067	Amer. Bosch Type T-6200
829		1927	6 cyl. (Early)		Auto-Lite MU-4001	Auto-Lite GAA-4001	Auto-Lite IB-4001
830		1927	Super-Six (Late)		Auto-Lite MU-4001A	Auto-Lite GAA-4001	Auto-Lite IB-4001
923		1928	Super Six (Early)		Auto-Lite MZ-4005	Auto-Lite GAA-4005	Auto-Lite IBA-4001
924		1928	Super Six (Late)	816865 and up	Auto-Lite MZ-4005	Auto-Lite GAM-4101	Auto-Lite IBA-4001
994		1929	Super Six Challenger	928658 and up	Auto-Lite MZ-4014	Auto-Lite GAM-4101	Auto-Lite IGB-4022
1056		1930	Super-Six	1165674 and up	Auto-Lite MZ-4017	Auto-Lite GAM-4102	Auto-Lite IGB-4030, 4033
1118		1931	Super Six	1234267 and up	Auto-Lite MAJ-4009	Auto-Lite GAM-4302	Auto-Lite IGB-4052
1174		1932	Greater Super Six	Starting Jan. 1, 1932 1281685 and up	Auto-Lite MAJ-4025	Auto-Lite GAL-4344	Auto-Lite IGB-4052-A
1239		1933	Terraplane, K, 6 cyl. Late 1932—Early 1933	350000 and up	Auto-Lite MAJ-4028	Auto-Lite GAM-4402	Auto-Lite IGB-4074-A
1240		1933	Terraplane, Model K 6 cyl.	364125 and up	Auto-Lite MAJ-4031	Auto-Lite GAM-4508	Auto-Lite IGB-4074-A
1241		1933	Terraplane, Model KT Straight Eight	65001 and up	Auto-Lite MAB-4051	Auto-Lite GAM-4508	Auto-Lite IGH-4024-A
925	FALCON-KNIGHT 1927-28			Car production discontinued	Auto-Lite MAB-4002	Auto-Lite GYA-4202	Auto-Lite IG-4107B
671	FLINT	1924-25	Flint Six		Dé Jon SA 4001	Dé Jon DA 4001	De'Jon LA-4001
672	(Cont. 6W)	1925	6-40		Auto Lite MG-4004	Auto Lite GJ-4014	Auto Lite IG-4043-A
751	(Cont. Spec'l)	1926	Jr. Six	Z-101 and up	Auto-Lite MP-4102	Auto-Lite GY-4101	Auto-Lite IG-4118-A
752	(Cont. 14U)	1926	B-60	B-15210 and up	Auto-Lite MN-4111	Auto-Lite GJ-4102	Auto-Lite IG-4118-A
831	(Cont. 9L)	1927	Z-18	1912 and up	Auto-Lite MP-4102	Auto-Lite GYA-4204	Auto-Lite IG-4118-A
832	(Cont. 14U)	1927	60	18776 and up	Auto-Lite MN-4111	Auto-Lite GY-4102A, GYA-4208-A	Auto-Lite IG-4118-C
833	(Cont. 6E)	1926-27	E-80 80	F-18961 and up 20103 and up Car production discontinued 1927	De' Jon or Auto Lite MN-4110	De' Jon or Auto Lite GRA-4101	De' Jon or Auto Lite IG-4121
	FORD			Serial and Motor Numbers are the same on left side of cylinder block over water inlet, not to be confused with casting number also on left			
673		1921-25	T		Ford	Ford	Ford Vibrating Coils
834		1926-27	T	12928868 and up	Ford	Ford	Ford Vibrating Coils
926		1928	A	CA-1 and up	Ford	Ford	Ford Single Coil and Dist.
995		1929	A	810128 and up	Ford	Ford	Ford
1057		1930	A		Ford	Ford	Ford
1119		1931	A	Starting Jan. 1, 1931 4237501 and up	Ford	Ford	Ford
1175		1932	B 4 cyl.		Ford	Ford	Ford
1176		1932	18 "Vee" 8		Ford 18-1100-2	Ford 18-10000	Ford
1242		1933	40 "Vee" 8	18203127 and up	Ford 40-11002	Ford 40-10,000	Mallory
674	FOX	1923-25	7-F	Car production discontinued	West. Frame 751	West. Frame 760	Scintilla Mag. Type AM-5
675	FRANKLIN	1924-25	10R 10-C	148842 and up (Superseded by Model 11-A)	Atwater Kent No. 6550	Atwater Kent Form No. 5970	Atwater Kent Type RA
676		1925	11-A		Owen Dyneto Type DG	Owen Dyneto Type CE	Atwater Kent Type RA
835		1926	11-A	151501 and up	Owen Dyneto Type DG	Owen Dyneto Type CE	Atwater-Kent Type RA

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Page	Name of Car	Year	Model	Serial Number and Location	Starter	Gen rator	Ignition
835		1927	11-B	158873-11 and up	Owen-Dyneto DH-696	Owen-Dyneto CG-697	Atwater-Kent No. 3427
927		1928	Air Man		Owen-Dyneto DH-696	Owen-Dyneto CD-788	North East TU-10770
996		1929	130 135-137		Delco-Remy 723-C	Delco-Remy 945-Y	Delco-Remy 640-T
1058		1930	145-147	198000 and up	Delco-Remy 723-C	Delco-Remy 957-E	Delco-Remy 642-B
1120		1931	151 and 152 "Transcontinent" 1	Starting Nov. 10, 1930 204000 and up	Delco-Remy 723-C	Delco-Remy 957-E	Delco-Remy 642-P
1121		1931	153 "DeLuxe"	Starting Nov. 10, 1930 204000 and up	Delco-Remy 723-C	Delco-Remy 957-E	Delco-Remy 642-P
1177		1932-33	6 cyl. Series Sixteen	Starting Jan. 1, 1932 208000 and up	Delco-Remy 723-C	Delco-Remy 957-E	Delco-Remy 643-N
1178		1932	12 cyl. Series Seventeen		Delco-Remy 545	Delco-Remy 931-G	Delco-Remy 667-A
1243		1933	Olympic Series 18, 6 cyl.	8311001-11 and up	Delco-Remy 723-C	Delco-Remy 957-E	Delco-Remy 644-E
1244		1933	Series 17-B "Vee" 12	10276 and up	Delco-Remy 545	Delco-Remy 931-G	Delco-Remy 667-A
GARDNER				Serial Number on right hand side under front cushion. (Lycoming (New Battery, P-O-L 6-11-SHK; see p. 12, Sec. AA.)	Motor.)		
677		1923-25	Series 5		West. Frame No. 33-AB	West. Frame No. 35-AT	Westinghouse Type SC
678	(Lycom. 2H)	1925	Series 8A		Remy 720-J	Remy 917-V	Remy 648-A
753	(Lycom. 2H)	1926	Straight Eight (8-A)	34526 and up	Remy 720-J	Remy 941-D	Remy 648-B
836	(Lycom. 4SM)	1925-27	6-A 6-B		Delco-Remy 720-J, 720-Q	Delco-Remy 941-B, 941-D	Delco-Remy 626-P, 636-H
837	(Lycom. GT)	1927	80	5DD01 and up	Delco-Remy 716-A	Delco-Remy 949-C	Delco-Remy 658-B
838	(Lycom. 4HM)	1927	90	5DD01 and up	Delco-Remy 720-Q	Delco-Remy 941-D	Delco-Remy 658-A
928	(Ly. GT, GS)	1928-29	75-85 125		Delco-Remy 716-A	Delco-Remy 949-C	Delco-Remy 658-B
929	(Ly. GT, MD)	1928-29	95 120-130		Delco-Remy 720-Y	Delco-Remy 949-A, 955-K	Delco-Remy 658-K, R
1059	(Lycom. V.R)	1930-31	136 6 cyl.	SST-827 and up	Delco-Remy 716-A	Delco-Remy 955-H	Delco Remy 640-L
1060	(Lycom. GR)	1930-31	140 Straight Eight	SSA-857 and up	Delco-Remy 716-A	Delco-Remy 955-H	Delco-Remy 658-B
1061	(Lycom. MDG)	1930-31	150 Straight Eight	SST-667 and up Production discontinued 1931	Delco-Remy 720-V	Delco-Remy 955-K	Delco-Remy 658-R
GRAHAM-PAIGE				(Formerly Paige) Name changed to Graham Jan. 1, 1930			
930		1928	610		North East Model SOK Type 6470	North East Model LO Type 6472	North East Model TU Type 10823
931		1928	614		North East Model SBH Type 6460	North East Model LB Type 6446	North East Model TPU Type 10863
932		1928	619 and 629		North East Model SBH Type 6462	North East Model LB Type 6447	North East Model TU Type 10833
933		1928	835		North East Model SBH Type 6462	North East Model LB Type 6447	North East Model TBU Type 10834
997		1929	612	848001 and up	Delco-Remy 713-K	Delco-Remy 955-Q	Delco-Remy 639-V
998		1929	615	713001 and up	Delco-Remy 718-E	Delco-Remy 957-B	Delco-Remy 639-W
999		1929	621	608001 and up	Delco-Remy 725-G	Delco-Remy 957-C	Delco-Remy 640-U
1000		1929	827 837	555001 and up 506101 and up	Delco-Remy 725-G	Delco-Remy 957-C	Delco-Remy 668-D
GRAHAM							
1062		1930	Standard Six	900001 and up	Delco-Remy 713-K	Delco-Remy 959-C	Delco-Remy 639-K
1063		1930	Special Six	785001 and up	Delco-Remy 718-E	Delco-Remy 957-B	Delco-Remy 640-W
1064		1930	Standard Eight Special Eight	660001 and up 615001 and up	Delco-Remy 725-K	Delco-Remy 957-B	Delco-Remy 660-C
1065		1930	Custom Eight	558001 and up	Delco-Remy 725-G	Delco-Remy 957-C	Delco-Remy 668-J
1122		1931-32	53, Standard Six 54, Special Six Prosperity Six	1500001 and up 1200001 and up Starting July 7, 1931 1516001 and up	Delco-Remy 714-V	Delco-Remy 957-B	Delco-Remy 632-F
1123		1931	8-20 8-34	1000001 and up 626001 and up	Delco-Remy 725-K	Delco-Remy 957-B	Delco-Remy 660-C

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Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
1179		1932	57, Blue Streak Series Standard and DeLuxe St. Eights	Starting Jan. 7, 1932 1010001 and up	Delco-Remy 725-K	Delco-Remy 965-V	Delco-Remy 661-J
1245		1933	65, Standard 6 cyl.	1605001 and up	Delco-Remy 734-N	Delco-Remy 965-V	Delco-Remy 632-Z
1246		1933	64, Standard & 57-A, Custom Straight Eights	1800001 and up 1020001 and up	Delco-Remy 725-K	Delco-Remy 965-V	Delco-Remy 661-J
598	GRAY	1924	N, O, T		West. Frame 33AB, S-331236	West. Frame 34 ATI, S-331275	Westinghouse Type SC, S-303015
679		1925	0	50000 and up	Auto Lite MO-4104	Auto Lite GW-4101	Auto Lite IG-4112-A
754		1926	S	Car production discontinued	Auto-Lite MO-4104	Auto-Lite GW-4101	Auto-Lite IG-4112-A
	HANSON			Serial Number on dash. (Continental Motor.)			
680		1921-25	60-66	Car Production Discontinued	Delco Model 164, 181	Delco Model 165	Delco No. 5207
681	HAYNES	1924-25	60	Car production discontinued	Leece-Neville Type 447-M	Leece-Neville Type 504G	Kingston
	H. C. S.			Serial Number on dash, left side. (Weidly Motor.)			
682		1923-25	6	3250 and up Production discontinued Sept., 1924	Delco Model 185	Delco Model 256	Delco No. 5259
755		1925-26	Taxicab		Amer. Bosch Type 952	Amer. Bosch Type 1269	Amer. Bosch T-4242
756	HERTZ (Cont. 7U)	1925-26	D-1		Delco Models 286, 313	Delco Models 301, 312	Delco, No. 5278 Integral Gen.
	HUDSON			Serial Number on right hand frame side member front end channel also on plate left side dash. (Own Motor.)			
599		1923-24	Super-Six		Amer. Bosch Type 926	Amer. Bosch 1238, 1252	Amer. Bosch T-6100
683		1925	Super-Six		Amer. Bosch Type 949	Amer. Bosch Type 1274	Amer. Bosch T-6202
757		1926	Super-Six (Early)		Amer. Bosch Type 949	Amer. Bosch Type 1281	Amer. Bosch Type T-6202
758		1926	Super-Six (Late)		Amer. Bosch Type 949	Amer. Bosch Type 1282	Amer. Bosch Type T-6202
839		1927	Super-Six (Early)		Auto-Lite MUA-4001	Auto-Lite GAB-4001	Auto-Lite IGA-4011
840		1927	Super-Six (Late)		Auto-Lite MUA-4001	Auto-Lite GAB-4008	Auto-Lite IGA-4011
934		1928	Super Six		Auto-Lite MUA-4001	Auto-Lite GAB-4008	Auto-Lite IGA-4023
1001		1929	Greater Super Six	825407 and up	Auto-Lite MUA-4001	Auto-Lite GAB-4008	Auto-Lite IGA-4058
1066		1930	Super Eight	893402 and up	Auto-Lite MAD-4108	Auto-Lite GAM-4102	Auto-Lite IGH-4009
1124		1931	Great Eight	(119" w. b.)-914293 and up (126" w. b.)-57115 and up	Auto-Lite MAB-4034	Auto-Lite GAM-4302	Auto-Lite IGH-4009-A
1180		1932	Greater Eight	Starting Jan. 1, 1932 930770 and up	Auto-Lite MAB-4041	Auto-Lite GAL-4344	Auto-Lite IGH-4009-B
1247		1933	E, Super Six 6 cyl.	1300501 and up	Auto-Lite MAJ-4025	Auto-Lite GAM-4403	Auto-Lite IGB-4074-A
1248		1933	Pacemaker Straight Eight	936703 and up	Auto-Lite MAB-4041	Auto-Lite GAL-4344 or 4544	Auto-Lite IGH-4009-B
	HUPMOBILE			Serial Number on plate inside cowl. (Own Motor.)			
684		1923-25	R12, 18	160001 and up	West. Frame 33 AB	West. Frame 35AT, 36DT	Westinghouse JN-395209
685		1925	Series E Linate		Westinghouse Frame 59AO	Westinghouse Frame 36GT	Atwater Kent RA-11050
759		1926	A-1 6 cyl.	A-5001 and up	Auto-Lite MN-4109	Auto-Lite GJ-4112	Auto-Lite IG-4117-A
760		1926	E-2 Straight Eight		Auto-Lite MR-4101	Auto-Lite GXB-4101	Delco No. 5295
841		1927	A-1 6 cyl.		Auto-Lite MN-4109	Auto-Lite GJ-4201	Auto-Lite IG-4117-A
842		1927	E-3 Straight Eight		Auto-Lite MR-4101	Auto-Lite GXB-4201	Delco No. 4027
935		1928	A-6 6 cyl.		Auto-Lite MN-4109	Auto-Lite GAJ-4101	Auto-Lite IGC-4001

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Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
936		1928	M Straight Eight		Auto-Lite ML-4139	Auto-Lite GAG-4106	Delco-Remy 657-C
1002		1929	A 6 cyl.	A-115001 and up	Auto-Lite MN-4109	Auto-Lite GAG-4106	Auto-Lite IGC-4003
1003		1929	M Straight Eight	M-13501 and up	Auto-Lite ML-4139	Auto-Lite GAG-4106	Auto-Lite IGH-4002
1067		1930	S 6 cyl.	Starting Aug. 1929 S-5001 and up	Auto-Lite MAC-4221	Auto-Lite GAI-4124	Auto-Lite IGC-4028
1068		1930	C (100 H.P.) Straight Eight	Starting Sept. 1929 C-5001 and up	Auto-Lite MAB-4021	Auto-Lite GAG-4118	Auto-Lite IGH-4008
1069		1930	H & U (130 H.P.) Straight Eight	5001 and up	Auto-Lite MR-4102	Auto-Lite GAG-4118	Auto-Lite IGH-4008
1125		1931	S-2 Century Six	S-30201 and up	Auto-Lite MAJ-4003	Auto-Lite GAI-4324	Auto-Lite IGC-4046
1126		1931	L Century Eight	L-5001 and up	Auto-Lite MAD-4113	Auto-Lite GAI-4338	Auto-Lite IGH-4008-C
1127		1931	C, 100 H.P. Straight Eight	10000 and up	Auto-Lite MAB-4021	Auto-Lite GAG-4118	Auto-Lite IGH-4008-C
1128		1931	H & U, 130 H.P. Straight Eights	6000 and up 5100 and up	Auto-Lite MR-4102	Auto-Lite GAG-4118	Auto-Lite IGH-4008-C
1181		1932	B, Series 216 6 cyl.	Starting Nov. 30, 1931 B-5001 and up	Auto-Lite MAJ-4003	Auto-Lite GAI-4324	Auto-Lite IGC-4053
1182		1932	F, Series 222 Straight Eight	Starting Dec. 5, 1931 F-5001 and up	Auto-Lite MAD-4118	Auto-Lite GAR-4317	Auto-Lite IGH-4021
1183		1932	I, Series 226 Straight Eight	Starting Dec. 9, 1931 I-5001 and up	Auto-Lite MAB-4021	Auto-Lite GAG-4118	Auto-Lite IGH-4021
1249		1933	K, Series 321 6 cyl.	K-5001 and up	Auto-Lite MAB-4050	Auto-Lite GAI-4521	Auto-Lite IGC-4056
1250		1933	F, Series 322 Straight Eight	F-8801 and up	Auto-Lite MAD-4113	Auto-Lite GAR-4317	Auto-Lite IGH-4021 A
1251		1933	I, Series 326 Straight Eight	I-5751 and up	Auto-Lite MAB-4042	Auto-Lite GAG-4138	Auto-Lite IGH-4021
686	JEWETT	1923-25	23-25		Remy 713-A, 713-C	Remy 913-E 917-U	Atwater Kent LA
761	(Cont. Spec'l)	1926	New-Day		Remy 711-E	Remy 943-A	Remy 637-A
NAME CHANGED TO PAIGE, JANUARY 1, 1927							
JORDAN			Serial Number plate on left hand side of front cross member of frame (Continental Motor.)				
687		1923-25	K & L	K-51401 and up L-41801 and up	Delco Model 208	Delco Model 256	Delco No. 5264
762	(Cont. Spec'l)	1926	J	70001 and up	Amer. Bosch Type 965	Amer. Bosch Type 1277	Amer. Bosch Type 8202
843	(Cont. 9K)	1926-27	Great Line Eight AA	60001 and up Fedco DL682-L and up	Amer. Bosch Type 937	Amer. Bosch Type 1261	Amer. Bosch Type T8202
844	(Cont. 12E)	1927	R		Auto-Lite MN-4124	Auto-Lite GYA-4207	Auto-Lite IGA-4013
845	(Cont. 8S)	1927	J-1	Fedco DY992-S and up	Auto-Lite MUA-4003	Auto-Lite GAF-1002	Auto-Lite IB-4004-A
937	(Cont. 14-E)	1928	RE 6 cyl.		Auto-Lite MN-4124	Auto-Lite GYA-4207	Auto-Lite IGA-4013
938	(Cont. 14-S)	1928	JE 8 cyl.		Auto-Lite MUA-4003	Auto-Lite GAG-4105	Auto-Lite IGD-4001-A IGD-4002-A
1004		1929	6-E	95001 and up	Auto-Lite MAD-4104	Auto-Lite GAG-4114	Auto-Lite IGB-4006-A
1005		1929	8-G Straight Eight	130001 and up	Auto-Lite MUA-4007	Auto-Lite GAG-4109	Auto-Lite IGJ-4001-A
1070	(Cont. 15-S)	1930-31	90 Straight Eight	131153 and up Production discontinued 1931	Auto-Lite MUA-4007	Auto-Lite GAG-4109	Auto-Lite IGJ-4001-A
KISSEL			Serial Number on right of frame ad jacent to right headlight.				
688		1922-25	55		Remy Mod 720D, 720R	Remy Mod 912B	Remy 626-B
846		1926-27	55 6-55	55-12001 and up	Delco-Remy 720-D, 720-V	Delco-Remy 944-A, 944-B	Delco-Remy 626-R, 627-C
847		1927	Popular Eight 8-65		Delco-Remy 716-A	Delco-Remy 919-C	Delco-Remy 658-B
848		1925-27	Big Straight Eight 8-75	75-5001 and up	Delco-Remy 720-J, 720-Q	Delco-Remy 917-V	Delco-Remy 648-A, 648-B
939		1928-29	6-70 6-73		Delco-Remy 716-A	Delco-Remy 919-C	Delco-Remy 636-S
940		1928-29	8-80 8-95		Delco-Remy 716-A	Delco-Remy 949-C, 955-H	Delco-Remy 658-B, L

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Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
1006		1929-30	126	120-1001 and up 126-4501 and up	Delco-Remy 720-Q	Delco-Remy 941-W	Delco-Remy 668-B
1071		1930	8-95 Straight Eight	95-3501 and up Production discontinued 1931	Delco-Remy 716-A	Delco-Remy 955-H	Delco-Remy 658-L
600	KURTZ	1923-24	65		West. Frame 100, S-286170	West. Frame 160, S-301190	Westinghouse Type DN, S-355554
	LAFAYETTE			Serial and Motor Number on right front motor support arm. (Own Motor.)			
601		1920-24	134	1001 and up	Delco MG No. 187	Delco MG No. 187	Delco No. 5221
849	LA SALLE	1927		Serial Number under hood left side dash.	Delco-Remy 725	Delco-Remy 370	Delco-Remy No. 4023
941		1928			Delco-Remy 725-C	Delco-Remy 384	Delco-Remy 4032
1007		1929	328	400001 and up	Delco-Remy 725-C	Delco-Remy 384	Delco-Remy 4041-4042
1072		1930	340	Starting Sept. 1929 600001 and up	Delco-Remy 728-D	Delco-Remy 927-D	Delco-Remy 4050-4055-4056
1129		1931	345-A "V8"	Starting Aug. 9, 1930 900000 and up	Delco-Remy 728-D	Delco-Remy 927-D	Delco-Remy 4055
1184		1932	345-B "V-8"	Starting Jan. 9, 1932 1100001 and up	Delco-Remy 728-P	Delco-Remy 927-S	Delco-Remy 660-Y
1252		1933	345-C "Vee" 8	2000001 and up	Delco-Remy 728-P	Delco-Remy 927-S	Delco-Remy 662-Y
	LEXINGTON			Serial Number on right front spring hanger. (Continental Motor.)			
689		1924-25	Concord Line	50001 and up	American Bosch Type 942	American Bosch Type 1051	Connecticut
763		1925-26	Minute-Man (Series 6-50)	500 and up Production discontinued 1927	Amer. Bosch Type 942	Amer. Bosch Type 1051	Connecticut Amer. Bosch
	LIBERTY			Serial Number on left front spring hanger. (Continental Motor.)			
690		1922-25	10B 10-E	Car production discontinued	Wagner Model EM-382	Wagner Model EM-370	Wagner
	LINCOLN			Serial Number on right hand side of dash under hood. (Own Motor.)			
691		1922-25	Eight		Delco MG Model 193	Delco MG Model 193	Delco No. 5226
764		1926	Eight		Delco MG Model 193	Delco MG Model 193	Delco No. 5226
850		1927	Eight	32030 and up	Delco MG Model 193	Delco MG Model 193	Delco No. 5226
942		1928-29	Eight		Delco-Remy MG 193	Delco-Remy MG 193	Delco-Remy 4029 and 5226
1073		1930	Eight		Delco-Remy MG-193	Delco-Remy MG-193	Delco-Remy 4029
1130		1931	"Vee" 8	66001 and up	Auto-Lite MAL-4001	Auto-Lite GAU-4001	Auto-Lite IGL-4001
1185		1932	"Vee" 8	Starting Jan. 1, 1932 70001 and up	Auto-Lite MAL-4001	Auto-Lite GAU-4001	Auto-Lite IGL-4001-A
1186		1932	"Vee" 12	Starting Jan. 1, 1932 KB-1 and up	Auto-Lite MAO-4001	Auto-Lite GBC-4001	Auto-Lite IGM-4001
1253		1933	Small "Vee" 12 Series 251, 136" W.B.		Auto-Lite MAO-4005	Auto-Lite GBC-4001	Auto-Lite IGM-4002
1254		1933	Big "Vee" 12 Series 511, 145" W.B.		Auto-Lite MAO-4003	Auto-Lite GBC-4101	Auto-Lite IGM-4002
	LOCOMOBILE						
765		1925-26	Jr. 8	101 and up	De' Jon SA 4003	De' Jon DA 4006	De' Jon IA-4008
851		1926-27	90	33101 and up	De' Jon SB-4001	De' Jon DA-4001- DD-4001	De' Jon IA-4007
852		1923-27	48		Westinghouse Frame No. 779	Westinghouse Frame No. 787R	Delco No. 5258
853		1927	8-66		De' Jon SA-4003	De' Jon DA-4006	De' Jon IA-4008
943 (Cont. Spec.)		1928	8-70		Delco-Remy 716-B	Delco-Remy 944-E	Delco-Remy 658-F
944 (Lycom. Spec.)		1928-29	8-80	Production discontinued 1929	De' Jon SA-4013	De' Jon DAA-4002	De' Jon IAA-4001, 4005

CAR INDEX (continued)

Page	Name of Car	Year	Model	Serial Number and Location	Starter	Gene-ator	Ignition
				Serial Number on plate on dash underneath cowl and on left side of frame. (Own Motor.)			
MARMON							
602		1923-24	34B		Delco Model 254	De co Model 253	Delco No. 17000
692		1925	74		Delco Model 254	Delco Model 253	Delco Integral Gen.
854		1926-27	74, E-75		Delco Model 320	Delco Model 319	Delco Model 17047
855		1927	Little		Delco-Remy 726-A	Delco-Remy 949-F	Delco-Remy 658-C
945		1928	68		Delco-Remy 714-G	Delco-Remy 949-X	Delco-Remy 658-C
946		1928	E-75		Delco 320	Delco 319	Delco 17047
947		1928-29	New 78		Delco-Remy 726-A	Delco-Remy 949-F	Delco-Remy 658-M
1008		1929	68 Straight Eight		Delco-Remy 714-G	Delco-Remy 949-X	Delco-Remy 651-A
1074		1930	69 Straight Eight		Delco-Remy 714-C	Delco-Remy 949-X	Delco-Remy 658-C
1075		1930	79 Straight Eight		Delco-Remy 718-M	Delco-Remy 949 F	Delco-Remy 652-D
1076		1930	Big Eight		Delco-Remy 718-M	Delco-Remy 949 F	Delco-Remy 652-D
1131		1931	70 Straight Eight	501 and up	Delco-Remy 714-C	Delco-Remy 949-X	Delco-Remy 652-D
1132		1931	88 Straight Eight	501 and up	Delco-Remy 718-M	Delco-Remy 949-F	Delco-Remy 652-D
1133		1931-33	16 cyl.	501 and up 801 and up	Delco-Remy 489	Delco-Remy 927-N	Delco-Remy 4084
1187		1932	70 Straight Eight		Delco-Remy 714-C	Delco-Remy 965 M	Delco-Remy 652 D
1188		1932	125 Straight Eight	8 cyl. Car Production discontinued 1932	Delco-Remy 718-M	Delco-Remy 965-L	Delco-Remy 652-D
1077	MARQUETTE	1930	Series 30 6 cyl.	Starting June 1929 10000 and up Production discontinued 1931	Delco-Remy 714-N	Delco-Remy 943 K	Delco-Remy 639-Y
MAXWELL							
603		1924	25		Remy 712A	Remy 95 C	Remy 369-C
693		1925	25	Car production discontinued in 1925	Remy 712-A, 712-B	Remy 951-C	Remy 369-C
				Serial Number on right front frame horn, also on plate attached to heel board. (Teetor-Hartley Motor and Own Motor.)			
McFARLAN							
604		1924	SV		Delco Model 240	Delco Model 258	Delco No. 5270
694		1921-25	147 TV	21001 and up	Westinghouse Frame, 777	Westinghouse Frame, 781-R	Splitdorf and Westinghouse
766	(Wis. Y)	1925-26	SV	500 and up	Delco Model 313	Delco Model 258	Delco No 5270
767		1926	Straight Eight	1000 and up	Delco Model 313	Delco Mode 256	Delco No. 5286
856		1926-27	TV (Standard)	23400 and up	De' Jon SC-4001	Delco Mode 319	Delco No. 17047
857	(Lycom 4H)	1927	Straight Eight	Car Production Discontinued July 1928	Delco-Remy 720-Q	Delco-Remy 941-S	Delco-Remy 658-A
				Serial Number on right hand rear spring hangar, also on dash under hood (Own Motor)			
MERCER							
605		1923-24	Series 6		West. Frame 711	West. Frame 56-AT	Splitdorf Mag. Type SS
695		1925	6	20500 and up Car production discontinued December, 1925.	Amer. Bosch Type 1117	Amer. Bosch Type 1250	Bosch Magneto ZR-6
				Serial Number under hood on dash. (Continental Motor.)			
MOON							
606		1924	6-58 6-48		Delco Model 181	Delco Mode 258	Delco No. 5208
607		1923-24	6-40 6Y Cont. Eng.		Delco Model 240	Delco Model 257	Delco No. 17002
608		1924	Series A		Delco Model 286	Delco Mode 287	Delco No. 5256
696 (Cont. 7Z) Early 1925			Series A		Delco Model 286	Delco Model 296	Delco No 5274
768	(Cont. 7Z)	1925-26	"Year Ahead Six" Series A	2510 and up	Delco Model 286	Delco Model 308	Delco No. 5274

CAR INDEX (continued)

Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
858	(Cont. 7Z)	1927	Series A		Delco Model 313	Delco Model 331	Delco No. 5274
859	(Cont. 26L)	1927-28	6-60		Delco-Remy 714-E	Delco-Remy 940-C	Delco-Remy No. 4017
948	(Cont. 11-E)	1928-29	6-72		Delco-Remy 714-G	Delco-Remy 949-V	Delco-Remy 640-F
949	(Cont. 15-S)	1928	8-80	Name changed to Windsor 1929	Delco-Remy 724-J	Delco-Remy 940-K	Delco-Remy 658-H
609	NASH	1924	41		Delco Model 228	Delco Model 269	Delco No. 5262
610		1924	681		Delco Model 230	Delco Model 269	Delco No. 5262
697		1924-25	(Big Six) Advanced	291281 and up	Delco Model 271	Delco Model 269	Delco No. 5263
698		1925	(Light Six) Special	51001 and up	Delco Model 292	Delco Model 291	Delco No. 5272
769		1926	21 51 Light Six	Formerly Ajax	Auto-Lite MN-4108	Auto-Lite GYA-4201	Auto-Lite IG-4110
770		1926	Light Six Special	75276 and up	Delco Model 323	Delco Model 291	Delco No. 5272
771		1926	Big Six Advanced	330126 and up	Delco Model 323	Delco Model 269	Delco No. 5288
860		1927	Light Six	R23874 and up	Auto-Lite MN-4108	Auto-Lite GYA-4205	Auto-Lite IG-4110
861		1927	Advanced	386972 and up	Delco-Remy 726-B	Delco-Remy Model 375	Delco-Remy 636-M
862		1927	Special	A26276 and up	Delco-Remy 726-B	Delco-Remy 949-G Delco 353	Delco-Remy 636-L
950		1928	Standard Six Series 320		Auto-Lite MN-4108	Auto-Lite GYA-4205	Auto-Lite IGA-4016
951		1928	Advanced Six Series 360		Delco-Remy 726-B	Delco-Remy 390	Delco-Remy 640-E
952		1928	Special Six Series 330		Delco-Remy 726-B	Delco-Remy 949-T	Delco-Remy 640-D
1009		1929	Standard Six Series 400	R-119559 and up	Auto-Lite MAC-4213	Auto-Lite GAL-4111	Auto-Lite IGB-4015
1010		1929	Advanced Six Series 400	452100 and up	Auto-Lite MAD-4102	Auto-Lite GAO-4101	Auto-Lite IGE-4001
1011		1929	Special Six Series 400	A-87450 and up	Auto-Lite MAD-4102	Auto-Lite GAL-4108	Auto-Lite IGE-4002
1078		1930	Single Ign. Six	Starting Oct. 1929 B-216590 and up	Auto-Lite MAB-4025	Auto-Lite GAL-4129	Auto-Lite IGB-4015
1079		1930	Twin Ign. Six	Starting Oct. 1929 B-37582 and up	Auto-Lite MAD-4107	Auto-Lite GAR-4104	Auto-Lite IGE-4005
1080		1930	Twin Ign. Eight	Starting Oct. 1929 496400 and up	Auto-Lite MAB-4024	Auto-Lite GAR-4109	Auto-Lite IGK-4001
1134		1931	Series 660 Single Ign. Six	R-249708 and up	Auto-Lite MAB-4026	Auto-Lite GAL-4329	Auto-Lite IGB-4015
1135		1931	Series 870 Single Ign. Eight	X-1001 and up	Auto-Lite MAB-4026	Auto-Lite GAL-4329	Auto-Lite IGH-4017
1136		1931	Series 880 Twin Ign. Eight	B-54928 and up	Auto-Lite MAB-4033	Auto-Lite GAR-4204	Auto-Lite IGK-4003
1137		1931	Series 890 Twin Ign. Eight	509201 and up	Auto-Lite MAB-4024	Auto-Lite GAR-4204	Auto-Lite IGK-4001
1189		1932	Series 1060 Single Ign. Six	R-267736 and up	Auto-Lite MAB-4026	Auto-Lite GAL-4329	Auto-Lite IGB-4071
1190		1932	Series 1070 Single Ign. Eight	X-21318 and up	Auto-Lite MAB-4026	Auto-Lite GAL-4329	Auto-Lite IGH-4017
1191		1932	Series 1080 Twin Ign. Eight	B-66800 and up	Auto-Lite MAB-4033	Auto-Lite GAR-4205	Auto-Lite IGK-4004
1192		1932	Series 1090 Twin Ign. Eight	519300 and up	Auto-Lite MAB-4024	Auto-Lite GAR-4205	Auto-Lite IGK-4001
1255		1933	1120 Big Six	R-274300 and up	Auto-Lite MAB-4049	Auto-Lite GAR-4205	Auto-Lite IGB-4081-B
1256		1933	1130 Standard Eight	X-26100 and up	Auto-Lite MAB-4049	Auto-Lite GAR-4205	Auto-Lite IGH-4023
1257		1933	1170 Standard Eight	X-25387 and up	Auto-Lite MAB-4026	Auto-Lite GAL-4329	Auto-Lite IGH-4017
1258		1933	1180 Twin Ignition Advanced Eight	B-70021 and up	Auto-Lite MAB-4033	Auto-Lite GAR-4205	Auto-Lite IGK-4004
1259		1933	1190 Twin Ignition Ambassador Eight	521191 and up	Auto-Lite MAB-4024	Auto-Lite GAR-4205	Auto-Lite IGK-4001

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Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
OAKLAND							
611		1924	6-54		Remy Mod. 713B	Remy Mod. 917K, S	Remy 616-E or 616-G
772		1925-26	6-54 "A" Six	37100 and up 64601-54 and up	Remy 713-B, 713-G	Remy 9-7-S	Remy 636-B
863		1927	Greater Six	120801-54 and up	Delco-Remy 713-G	Delco-Remy 914-M	Delco-Remy 636-B, 636-J
953		1928	All American Six		Delco-Remy 714-F	Delco-Remy 919-N	Delco-Remy 640-B
1012		1929	All American Six	227001 and up	Delco-Remy 714-F	Delco-Remy 949-N	Delco-Remy 640-K
1081		1930	101 "Vee" Eight	Starting Jan. 1930 273500 and up	Delco-Remy 726-H	Delco-Remy 959-J	Delco-Remy 650-A
1138		1931	301 "Vee" Eight	296001 and up Production discontinued 1932	Delco-Remy 716-H	Delco-Remy 959-Z	Delco-Remy 661-B
OLDSMOBILE							
612		1924	6-30		Delco Model 274	Delco Model 273	Delco No. 17008
699		1925	30	13746 and up	Delco Model 274	Delco Model 295	Delco Integral Gen.
773		1926	Series D 30	12001 and up	Delco Model 326	Delco Model 327	Delco No. 5284
864		1927	30-E (Early)	S-16001 and up	Delco Model 354	Delco Model 352	Delco No. 5281
865		1927	30-E (Late)		Delco-Remy 713-G	Delco-Remy 910-B	Delco-Remy 637-T
954		1928	F-28	1 and up	Delco-Remy 714-H	Delco-Remy 919-W	Delco-Remy 639-B, G
		1929	F-29	10001 and up			
1082		1930	F-30	SC-10001 and up	Delco-Remy 714-H	Delco-Remy 919-W	Delco-Remy 639-G
1139		1931	F-31 6 cyl.		Delco-Remy 714-H	Delco-Remy 955-R	Delco-Remy 639-G
1193		1932	F-32 6 cyl.	1001 and up	Delco-Remy 734-B	Delco-Remy 913-H	Delco-Remy 632-P
1194		1932	L-32 8 cyl.	1001 and up	Delco-Remy 725-L	Delco-Remy 913-H	Delco-Remy 660-T
1260		1933	F-33 6 cyl.	24001 and up	Delco-Remy 734-K	Delco-Remy 953-S	Delco-Remy 632-P
1261		1933	L-33 Straight Eight	7001 and up	Delco-Remy 725-Y	Delco-Remy 953-S	Delco-Remy 662-K
OVERLAND							
700		1923-25	91-4 cyl.	(New Battery, USL 3CVF5X; see p. 701)	Auto Lite MO-4101 MO 4001	Auto Lite GP-4101 GP-1003A	Auto Lite IG-4036A
701		1925	93-6 cyl.		Auto Lite MN-4104	Auto Lite GP-4103	Auto Lite IG-4116A-B
774		1926	91		Auto-Lite MO-4101	Auto-Lite GP-4101	Auto-Lite IG-4036-A
775		1926	93		Auto-Lite MN-4104	Auto-Lite GP-4103-A	Auto-Lite IG-4116-B
NAME CHANGED TO WHIPPET, JANUARY 1, 1927							
PACKARD							
702		1923-25	Single Six 326-333		Owen Dyneto DE-524	Owen Dyneto CI-523	Delco No. 5256
702		1925	Straight Eight 236-243	(New Battery, P-O-L A-6-17-SHK, see Sec. AA.)	Owen Dyneto DG-646	Owen Dyneto CI-523	Delco No. 5260
776		1926	Six		Owen Dyneto DH-695	Owen Dyneto CG-678	Delco No. 5249
777		1926	Straight Eight		Owen Dyneto DG-646	Owen Dyneto CI-523	Delco No. 5260
868		1927	Six		Owen-Dyneto DH-695	Owen-Dyneto CG-678	Delco No. 4009
869		1927	Straight Eight		Owen-Dyneto PG-646	Owen-Dyneto CI-523	Delco No. 4008
955		1928	Six		Owen-Dyneto DII-695	Owen-Dyneto CI-777	Delco-Remy 656-J
956		1928	Straight Eight		Owen-Dyneto DM-696	Owen-Dyneto CI-800	Delco-Remy 1033
1013		1929	Straight Eight		Owen-Dyneto DM-693	Owen-Dyneto CI-800	North East TEU-10858
1083		1930	726-733	Starting Sept. 1929 277013 and up	Owen-Dyneto DI-850	Owen-Dyneto CI-855	North East TEU-10868
1084		1930	740-745	Starting Sept. 1929 179013 and up	Owen-Dyneto DN-860	Owen-Dyneto CI-865	North East TEU-10868
1140		1931	826 and 833 Small St. Eights		Owen-Dyneto DI-850	Owen-Dyneto CI-896	North East TEU-10896

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Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
1141		1931	840 and 845 Big St. Eights		Owen-Dyneto DN-860	Owen-Dyneto CL-896	North East TEU-10896
1195		1932	900 Light St. Eight	Starting Jan. 1, 1932 360001 and up	Owen-Dyneto DI-1034	Owen-Dyneto CL-1005	North East 5031262
1196		1932	901 and 902 Small St. Eight	Starting June 23, 1931 340001 and up	Owen-Dyneto DI-1034	Owen-Dyneto CL-1005	North East 5028025
1197		1932	903 and 904 Large St. Eight	Starting June 23, 1931 193001 and up	Owen-Dyneto DN-952	Owen-Dyneto CL-1005	North East 5028025
1198		1932	905 and 906 Twin Six, "V12"	900001 and up	Owen-Dyneto DN-1072	Owen-Dyneto CL-1033	Auto-Lite IGO-4001
1262		1933	1001 and 1002 Small St. Eights	370001 and up	Owen-Dyneto DI-1034	Owen-Dyneto CL-1005	North East 5033450
1263		1933	1003 and 1004 Super St. Eights	750001 and up	Owen-Dyneto DN-1107	Owen-Dyneto CO-1130	North East 5033450
1264		1933	1005 and 1006 "Vee" 12	901001 and up	Owen-Dyneto DN-1072	Owen-Dyneto CO-1119	Auto-Lite IGO-4001
PAIGE				Serial and Motor Numbers together on left side of Motor.			
703	(Cont. 10A)	1923-25	21-25	(New Battery, West. 6-OB-19; for data see Sec. AA)	Remy 722-A	Remy 913-H, 923-A	Atwater Kent
778		1926	24-26		Remy 713-F	Remy 917-ZA	Atwater-Kent Type LA
870	(Cont. Spec.)	1927	6-45		Delco-Remy 713-F	Delco-Remy 943-A	Delco-Remy 637-R
871		1927	6-65		Delco-Remy 713-F	Delco-Remy 941-P	Atwater-Kent Type LA
872		1927	6-75		Delco-Remy 721-D	Delco-Remy 941-P	Atwater-Kent Type LA
873	(Lycom. Sp c.)	1927	8-85		Delco-Remy 720-Q	Delco-Remy 945-F	Delco-Remy 658-A
NAME CHANGED TO GRAHAM-PAIGE, JANUARY 1, 1928							
PATERSON				Serial Number on left side of front seat.			
613		1920-24	47, 6 cyl. 7R Cont. Eng.		Delco Model 181	Delco Model 165	Delco
614		1922-24	7R Cont. Eng. 8R Cont. Eng.	Production discontinued 1924	Delco Model No. 181	Delco Model 165	Delco No. 5207
PEERLESS							
615		1923-24	56 Series 7		Delco Model 248	Delco Model 247	Delco No. 5250
704		1924-25	70-72	(New Battery, Exide 3XC-15-1; see Sec. AA.)	Delco Model 282	Delco Model 284	Delco No. 5267
705		1925	V-Eight 67	329501 and up	Delco Model 277	Delco Model 258	Delco No. 5250
779		1926	6-80	350-501 and up	Auto-Lite MN-4102	Auto-Lite GY-4102	Auto-Lite IGA-4118-B
874		1926-27	6-72	302-501 and up	Delco Model 282	Delco Model 284	Delco No. 5267
875		1926-28	8-69 (V-Eight)	335-500 and up	Delco Model 277	Delco Model 258	Delco No. 5297
876	(Cont. Spec.)	1927	6-60		Auto-Lite MN-4128	Auto-Lite GYA-4207	Auto-Lite IGA-4012
877	(Cont. 8U)	1927-28	6-80		Auto-Lite MN-4114	Auto-Lite GAG-4101	Auto-Lite IGA-4003A
878		1927	6-90		Auto-Lite MN-4102	Auto-Lite GRE-4206	Auto-Lite IGA-4004
957	(Cont. 10-E)	1928	6-60		Auto-Lite MN-4128	Auto-Lite GYA-4207	Auto-Lite IGA-4012
958		1928-29	6-91		Delco-Remy 720-Z	Delco-Remy 945-Q	Delco-Remy 641-B
1014	(Cont. 11-E)	1929	6-61	C-610001 and up	Auto-Lite MAC-4203	Auto-Lite GAL-4110	Auto-Lite IGB-4023
1015	(Cont. 18-C)	1929	6-81	C-810001 and up	Auto-Lite MAD-4104	Auto-Lite GAG-4114	Auto-Lite IGB-4106-A
1016		1929	125	Starting Aug. 1929 C-126291 and up	Delco-Remy 725-G	Delco-Remy 945-U	Delco-Remy 668-D
1085		1930	61-A	Starting Aug. 1929 C-616501 and up	Delco-Remy 718-H	Delco-Remy 949-V	Delco-Remy 631-F
1086		1930	Standard A Straight Eight	A-10001 and up	Auto-Lite MAB-4029	Auto-Lite GAL-4134	Auto-Lite IGH-4011-A
1087		1930	Master B Custom C	7001 and up 4001 and up	Auto-Lite ML-4146	Auto-Lite GAR-4111	Auto-Lite IGH-4010
1142		1931	Standard A Straight Eight		Auto-Lite MAB-4029	Auto-Lite GAL-4134	Auto-Lite IGH-4011-A
1143		1931-32	Master B and Custom C Straight Eights	5001 and up 8001 and up Production discontinued 1932	Auto-Lite ML-4146	Auto-Lite GAR-4111	Auto-Lite IGH-4010

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Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
PIERCE-ARROW				Serial Number on body, left side below front door. (Pierce Motor.)			
706		1924-25	Series 33		Delco Model 252	Delco Model 238	D lco No. 5216, 5265
780		1925-26	80		Delco Model 297	Delco Model 300	Delco Integral Gen.
879		1926-27	33, 36	361000 and up	Delco Model 252	Delco Model 279	Delco Model 5265
880		1927-28	80, 81		Delco Model 336	Delco Model 300	Delco No. 17042
959		1928	86		De' Jon SC-4002	De' Jon DE-4002	De' Jon IA-4035
1017		1929	133-140		Delco-Remy 728-C	Delco-Remy 955-P	Delco-Remy 668-E
1088		1930	132 Straight Eight	Starting Sept. 1929 2005011 and up	Delco-Remy 728-C	Delco-Remy 959-F	Delco-Remy 652-E
1089		1930	134-139 144	Starting Jan. 1930 2500001 and up	Delco-Remy 728-C	Delco-Remy 927-F	Delco-Remy 668-E
1144		1931	41-147" Wh'l Base 42-142" Wh'l Base	3050001 and up 2525001 and up	Delco-Remy 728-C	Delco-Remy 927-F	Delco-Remy 668-E
1145		1931	43-134" and 137" Wheel Base	1025001 and up 1500001 and up	Delco-Remy 728-C	Delco-Remy 927-L—959-F	Delco-Remy 660-P
1199		1932	54 Straight Eight	Starting Nov. 9, 1931 1050001 and up	Delco-Remy 497	Delco-Remy 927-U	Delco-Remy 660-P
1200		1932	51, 52, 53 "Vee" 12	Starting Nov. 9, 1931 3075001 and up	Delco-Remy 498	Delco-Remy 927-U	Delco-Remy 4096
1265		1933	836 and 839 Straight Eights	1070001 and up 1550001 and up	Delco-Remy 497	Delco-Remy 927-V	Delco-Remy 662-J
1266		1933	1236, 1239 1242 and 1247 "Vee" 12	2075001 and 2575001 and up 3100001 and 3525001 and up 3525001 and 3550001 and up	Delco-Remy 498	Delco-Remy 927-V	Delco-Remy 4105
PILOT				Serial Number on left front frame horn. (Teetor-Hartley Motor.)			
616		1924	6-56	Production discontinued 1921	Wagner, S487	Wagner, S488A	Wagner K-742
PLYMOUTH							
1018		1929	55 4 cyl.	HL950P and up	Delco-Remy 711-J	Delco-Remy 947-B	Delco-Remy 630-B
1090		1930	4 cyl.	Starting July 1929 Y000WW and up	Delco-Remy 714-Q	Delco-Remy 947-B	Delco-Remy 635-W
1146		1931	30-U 4 cyl.	Starting July 1, 1930 1530245 and up	Delco-Remy 714-Q	Delco-Remy 943-R	Delco-Remy 629-A
1201		1932	PA 4 cyl. (Early)	Starting July 1, 1931 1570301 and up	Delco-Remy 714-Q	Delco-Remy 943-R	Delco-Remy 629-H
1202		1932	PB 4 cyl. (Late)	Starting Feb. 12, 1932 1670001 and up	Delco-Remy 714-Q	Delco-Remy 943-S	Delco-Remy 629-M
1267		1933	PC 6 cyl. (Early)	1759001 and up	Delco-Remy 734-H	Delco-Remy 943-S or 937-E	Delco-Remy 622-H
1268		1933	PC and PC DeLuxe 6 cyl. (Late)		Delco-Remy 734-H	Delco-Remy 937-E or 943-S	Delco-Remy 644-H
PONTIAC				Serial Number on rear frame cross member below gas tank filler.			
781		1926	6-27		Remy 710-C	Remy 943-C	Remy 637-C
881		1927	Six	1-27 and up	Delco-Remy 714-C	Delco-Remy 943-C	Delco-Remy 637-C-637-L-637-M
960		1928	Six	334006 and up	Delco-Remy 714-F	Delco-Remy 943-B	Delco-Remy 639-A
1019		1929	6-29	410101 and up	Delco-Remy 714-F	Delco-Remy 943-J	Delco-Remy 639-U
1091		1930	6-30	Starting Jan. 1930 591501 and up	Delco-Remy 714-R	Delco-Remy 943-J	Delco-Remy 639-U
1147		1931	401 6 cyl.	649001 and up	Delco-Remy 714-R	Delco-Remy 943-J	Delco-Remy 639-U
1203		1932	402 6 cyl.	729001 and up	Delco-Remy 734-A	Delco-Remy 943-Y	Delco-Remy 639-U
1204		1932	302 "Vee" 8	310001 and up	Delco-Remy 726-K	Delco-Remy 959-Z	Delco-Remy 661-C
1269		1933	Series 601 Straight Eight	770001 and up	Delco-Remy 734-G	Delco-Remy 937-B	Delco Remy 661-M
PREMIER				Serial Number under front seat cushion left side.			
617		1922-24	6-D	Production discontinued 1925	Delco Model 194	Delco Model 195	Delco
R & V KNIGHT (Formerly Moline-Knight)				Serial Number on plate on dash. (Own Motor.)			
618		1923-24	H	Production discontinued 1925	Auto-Lite Model ML	Auto-Lite M del GJ	Auto-Lite

CAR INDEX (continued)

Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
REO				Serial Number on right hand sub frame.			
619		1924	Series C		North East Mod. R, Type 3581-A	North East Model MAT, Type 3929-L-6 6089-L-6	North East Model T
707		1925	E (Touring) E&G (Sedan)	71001 and up	North East Model R Type 3581A	North East Model MAT Type 3929L-6	North East Model T
708		1925	E (Coupe)	(Series 1-250; Series 250-500) Note:—Trouble socket left off cars	(Same as above)	(Same as above)	(Same as above)
782		1925	E (Coupe)	Series 250-500. (After 500)	North East Model R Type 3581A	North East Model MAT Type 3929L-6	North East Model T
782		1925-26	T-6	83933 and up	North East Model SR Type 3581	North East Model MAT Type 6089-L-6	North East Model T
882		1927-28	Flying Cloud		Delco-Remy 724-E	Delco-Remy 949-B	Delco-Remy 686-K
883		1927	Wolverine		North East Model SBH Type 6304	North East Model LB Type 6394	North East Model TU Type 10820
961 (Cont. 16-E)		1928	Wolverine		North East Model SBH Type 6304	North East Model LB Type 6394	North East Model TU 10820A
1020		1929-30	Master 20	C-1 and up 100 and up	Delco-Remy 724-M, V	Delco-Remy 955-G	Delco-Remy 640-G
1021		1929-30	Mate 15	B-2-14001 and up 2246-5 and up	Delco-Remy 726-E	Delco-Remy 955-L	Delco-Remy 641-D
1092		1930	25	Starting Aug. 1929 100 and up	Delco-Remy 724-V	Delco-Remy 955-G	Delco-Remy 640-S
1148		1931-32	C-3-25, 6 cyl. "Flying Cloud"	Starting Sept. 18, 1930 25N-1 and up	Delco-Remy 728-M	Delco-Remy 955-G	Delco-Remy 640-S
1149		1931-32	8-30, "Fly. Cloud" 8-35, "Royale"	30N-1 and up 35N-1 and up	Delco-Remy 728-M	Delco-Remy 955-G	Delco-Remy 660-K
1205		1932	S 6 cyl.		Delco-Remy 718-H	Delco-Remy 955-R	Delco-Remy 641-H
1270		1933	S2-33, Flying Cloud 6 cyl.	S-1510 and up	Delco-Remy 718-H	Delco-Remy 955-R	Delco-Remy 644-M
1271		1933	N-2, Royale Straight Eight		Delco-Remy 728-M	Delco-Remy 955-G	Delco-Remy 660-K
REVERE				Serial Number under Driver's seat. (Duesenberg Motor.)			
709		1920-25	C, D 4 cyl.-M		Westinghouse Frame, 776	Westinghouse Frame, 781-R	Bosch Magneto Type ZR 4
783 (Cont. 6J)		1925-26	6 cyl.-25	Car production discontinued	Amer. Bosch Type 1118	Amer. Bosch Type 1250	Amer. Bosch TM-672
RICKENBACKER							
710		1923-25	6 cyl.-D		Amer. Bosch Type 933	Amer. Bosch Type 1032	Amer. Bosch T-6248
784		1925-26	8 cyl.-A 8-B	25001 and up 27001 and up	Amer. Bosch Type 947, 957	Amer. Bosch Type 1055, 1066	Delco Nos. 5276, 5292
785		1926	6-E	Production discontinued early 1927	Amer. Bosch Type 966	Amer. Bosch Type 1066	Amer. Bosch
ROAMER				Serial Number under dash on floor-board right side. (Continental and Duesenberg Motors.)			
620		1920-24	Duesenberg Eng. Mod. 4-75-E, 4 cyl.		Westinghouse Frame 711	Westinghouse Frame, 781-R, 760	Bosch Magneto
621		1920-24	Continental Eng. Mod. 6-54-E, 6 cyl.		Bijur Mod. ED-160, M-1768	Bijur, Mod. L-220 M-1360	Bosch Magneto
711 (Cont. 7U)		1925	6-50		Auto Lite	Auto Lite	Auto Lite
712		1925	8-88		Auto Lite	Auto Lite	Delco
786 (Cont. 7U)		1926	6-50-55		Auto-Lite MG-4102	Auto-Lite GJ-4103	Auto-Lite IG-4084-A
884 (Lycom. 8)		1926-27	8-78, 8-88	Car production discontinued 1927	Auto-Lite MN-4102	Auto-Lite GJ-4116	Auto-Lite IG-4105
ROCKNE							
1206		1932	65 6 cyl.	00001 and up	Auto-Lite MAJ-4026	Auto-Lite GAM-4401	Auto-Lite IGB-4070
1207		1932	75 6 cyl.	1500001 and up	Auto-Lite MAN-4001	Auto-Lite GAM-4401	Auto-Lite IGB-4062
1272		1933	10 6 cyl.	16151 and up	Auto-Lite MAJ-4030	Auto-Lite GAM-4501	Auto-Lite IGB-4070-A

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Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
713	ROLLIN	1924-25	G	Car production discontinued in 1925	Owen Dyneto DE 607	Owen Dyneto CE 614	Conn. 373-Y
885	ROLLS-ROYCE	1925-28	40-50		Westinghouse Frame 778 S-382435	Westinghouse Frame 571-R S-416699	Bosch T-6221
1022		1929-30	Phantom 40-65		Rolls-Royce	Rolls Royce	De' Jon IAA-4004
1023	ROOSEVELT	1929-30	Straight Eight	Production discontinued 1931	Delco-Remy 714-C	Delco-Remy 949-X	Delco-Remy 658-C
1093	RUXTON	1930	C F.W.Drive	Production discontinued 1931	Auto-Lite MUA-4007	Auto-Lite GAC-4121	Auto-Lite IGH-4005-A
	SAYERS			Serial Number on cowl under hood. (Continental Motor.)			
622		1923-24	CL 6T Cont. Eng.	Production discontinued 1925	Delco, Mod. No. 208	Delco, Mod. No. 256	Delco
	STANLEY STEAMER			Serial Number on name plate on chassis frame			
623		1922-24	740	20001 to 20999 21000 and up	None	Bijut Type L-220-M-1802	None
714		1925	252		None	Amer. Bosch Type 1272	None
624	STAR	1922-24			Auto-Lite Model MG	Auto Lite Model GJ	Auto-Lite
715	(Cont. Spec.)	1925	F-25		Auto Lite MO-4102	Auto Lite G1 4001	Auto Lite IG-4047
787	(Cont. Spec.)	1926	Model M (4 cyl.)		Auto-Lite MO-4102	Auto-Lite GT-4001A	Auto-Lite IG-4036D
788	(Cont. Spec.)	1926	Model R (Standard Six)		Auto-Lite MO-4102	Auto-Lite GT-4001A	Auto-Lite IG-4067-A
886	(Cont. W-5)	1927	Four	380000 and up	Auto-Lite MO-4102	Auto-Lite GT-4001-A	Auto-Lite IG-4036-L
887	(Cont. 14L)	1927	Six	16000 and up	Auto-Lite MO-4102	Auto-Lite GT-4001-A	Auto-Lite IG-4067-A
NAME CHANGED TO DURANT, JANUARY 1, 1928							
	STEARNS-KNIGHT			Serial Number on floor board right side. (Own Motor.)			
625		1923-24	S		West. Frame 755, S-355497A	West. Frame 57GT, S 394498	Atwater Kent RA West.
626		1924	B		West. Frame 755, S-355497A	West. Frame 57GT S 394498	
789		1925-26	C-6 cyl.	C-1250 and up	De' Jon SB-4003	De' Jon DC-4001	De' Jon IA-4004
790		1925-26	S-6 cyl.	S-3400 and up	De' Jon SB-4003	De' Jon DC-4001	De' Jon IA-4004
888		1927-28	6-85		De' Jon SD-4102	De' Jon DA-4016	De' Jon IAA-4003
889		1927-28	8-85		De' Jon SD-4102	De' Jon DA-4016	De' Jon IAA-4002
1024		1929	6-80	M-21572 and up N-51595 and up	Auto-Lite MAB-4001	Auto-Lite GRD-4207	Auto-Lite IGA-4035
1025		1929	8-90	H-15696 and up J-11773 and up Production discontinued 1929	De' Jon SD-4102	De' Jon DA-4016	De' Jon IAB-4001
	STEPHENS			Serial and Motor Number on dash under hood, right side.			
627		1923-24	10-20		Delco Model 262	Delco, Model 258	Delco No. 5257
628	STERLING KNIGHT	1924	L 6		West. Frame 771	West. Frame 57 GT	Westinghouse S-JN-382528
716		1925	B-6	Car production discontinued	De' Jon SB 4004	De' Jon DC 4002	De' Jon IA-4006
629	STEVENS-DURYEA	1921-24	Model E		Westinghouse Frame, 777	Westinghouse Frame, 781-R	Berling Magneto
791		1924-26	G	Car production discontinued	Amer. Bosch Type 1119, 1121	Amer. Bosch Type 1226	Berling Magneto
	STUDEBAKER			Serial Number on left side of frame over front axle. (Own Motor.)			
630		1922-24	Light Six		Wagner, EM-201	Wagner, EM-355	Wagner, K-43
631		1922-24	Big & Spec. Six		Wagner, EM-356	Wagner, EM-338	Wagner, K-43

CAR INDEX (continued)

Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
632		1921-24	Big Six Special Six		Remy, Mod. Nos. 723-A, 736-A	Remy, Mod. 917-E	Remy Battery
633		1922-24	Light Six		Remy 720-C	Remy, Mod. 917-A	Remy Battery
792		1925-26	Model ER (Standard Six)	1202001 and up	Remy 720-M	Remy 917-A	Remy 626-K
793		1925	EP, EQ Special & Big Six	2060001 and up 3120001 and up	Remy 723-A	Remy 917-E	Remy 626-L
793		1925-26	Model EQ Special Model EP Big Six		Remy 723-B	Remy 941-L	Remy 626-S, 626-W
890		1927	Standard Six		Delco-Remy 720-N	Delco-Remy 941-K	Delco-Remy 626-K, 636-P
891		1927	Big Six		Delco-Remy 723-B	Delco-Remy 941-L	Delco-Remy 626-X-636-N
962		1928-29	Dictator		Delco-Remy 720-N	Delco-Remy 949-J	Delco-Remy 636-W, Y
963		1928	Commander		Delco-Remy 723-B	Delco-Remy 941-L	Delco-Remy 636-X
964		1928	President		Delco-Remy 724-H	Delco-Remy 949-U	Delco-Remy 658-J
1026		1929	Commander 6 cyl.	GH-4062101 and up GJ-4070501 and up	Delco-Remy 726-F	Delco-Remy 949-J	Delco-Remy 636-Y
1027		1929	Commander 8 cyl.	FD-8000001 and up	Delco-Remy 726-G	Delco-Remy 955-C	Delco-Remy 658-V, Z
1028		1929-30	President	FE-6018001 and up	Delco-Remy 728-C	Delco-Remy 955-C	Delco-Remy 668-C
1094		1930	Commander Eight Dictator Eight	FD-80110001 and up FC-2120001 and up	Delco-Remy 726-G	Delco-Remy 955-C, 955-S	Delco-Remy 658-Z
1150		1931	53, 6 cyl. (Early)	Starting June 27, 1930 5085001 and up	Delco-Remy 718-L	Delco-Remy 955-U	Delco-Remy 639-J
1151		1931	54, 6 cyl. (Late)	5096001 and up	Delco-Remy 718-V	Delco-Remy 943-J	Delco-Remy 632-J
1152		1931	61, Dictator Straight Eight	Starting Sept. 18, 1930 9000001 and up	Delco-Remy 718-Q	Delco-Remy 955-C	Delco-Remy 658-Z
1153		1931	70, Commander Straight Eight	Starting June 27, 1930 8025001 and up	Delco Remy 718-Q	Delco-Remy 955-C	Delco-Remy 658-Z
1154		1931	80 & 90, President Straight Eights	7031001 and up 6022001 and up	Delco Remy 723-C	Delco-Remy 927-J	Delco-Remy 668-C
1208		1932	55 6 cyl.	5120001 and up	Delco Remy 718-Z	Delco-Remy 943-V	Delco-Remy 682-M
1209		1932	62, Dictator Straight Eight	9015001 and up	Delco-Remy 718-Y	Delco-Remy 955-C	Delco-Remy 660-M
1210		1932	71, Commander Straight Eight	8036001 and up	Delco-Remy 718-Y	Delco-Remy 955-C	Delco-Remy 660-M
1211		1932	91, President Straight Eight	6025001 and up	Delco-Remy 497	Delco-Remy 927-J	Delco-Remy 662-A
1273		1933	56 6 cyl.	5133401 and up	Delco-Remy 718-Z	Delco-Remy 943-V	Delco-Remy 622-A
1274		1933	73, Commander and 82, President Straight Eights	8040001 and up 7040001 and up	Delco-Remy 718-Y	Delco-Remy 955-C	Delco-Remy 662-H
1275		1933	92, Speedway President Straight Eight	6027401 and up	Delco-Remy 497	Delco-Remy 927-J	Delco-Remy 662-G
STUTZ				Serial Number on left side of dash.			
634		1923-24	6-60		Remy Model 720J	Remy, Mod. 917-R	Remy Battery 626-H
717		1921-25	4-cyl.		Remy Mod. 741A, 741B	Remy, Model OF	Delco No. 5209
718		1925	6-94	14001 and up	Remy 720-J	Remy 917-R	Remy 626-J
794		1926	AA (Straight Eight)		Delco Model 334	Delco Model 333	Delco No. 5296
892		1927	AA (Straight Eight) (Early)		Delco Model 334	Delco Model 363	Delco No. 4022
893		1927	AA (Straight Eight) (Late)		Delco-Remy 726-C	Delco-Remy 949-H	Delco No. 4022
965		1928-30	BB & M (Straight Eights)		Delco-Remy 726-C	Delco-Remy 391	Delco-Remy 4022-4028
1155		1931	LA 6 cyl.	17523 and up	Delco-Remy 726-C	Delco-Remy 949-H	Delco-Remy 4043
1212		1932	DV-32 Straight Eight	1001 and up—Pleasure Car pro- duction discontinued 1932.	Delco-Remy 726-C	Delco-Remy 391	Delco-Remy 660-W

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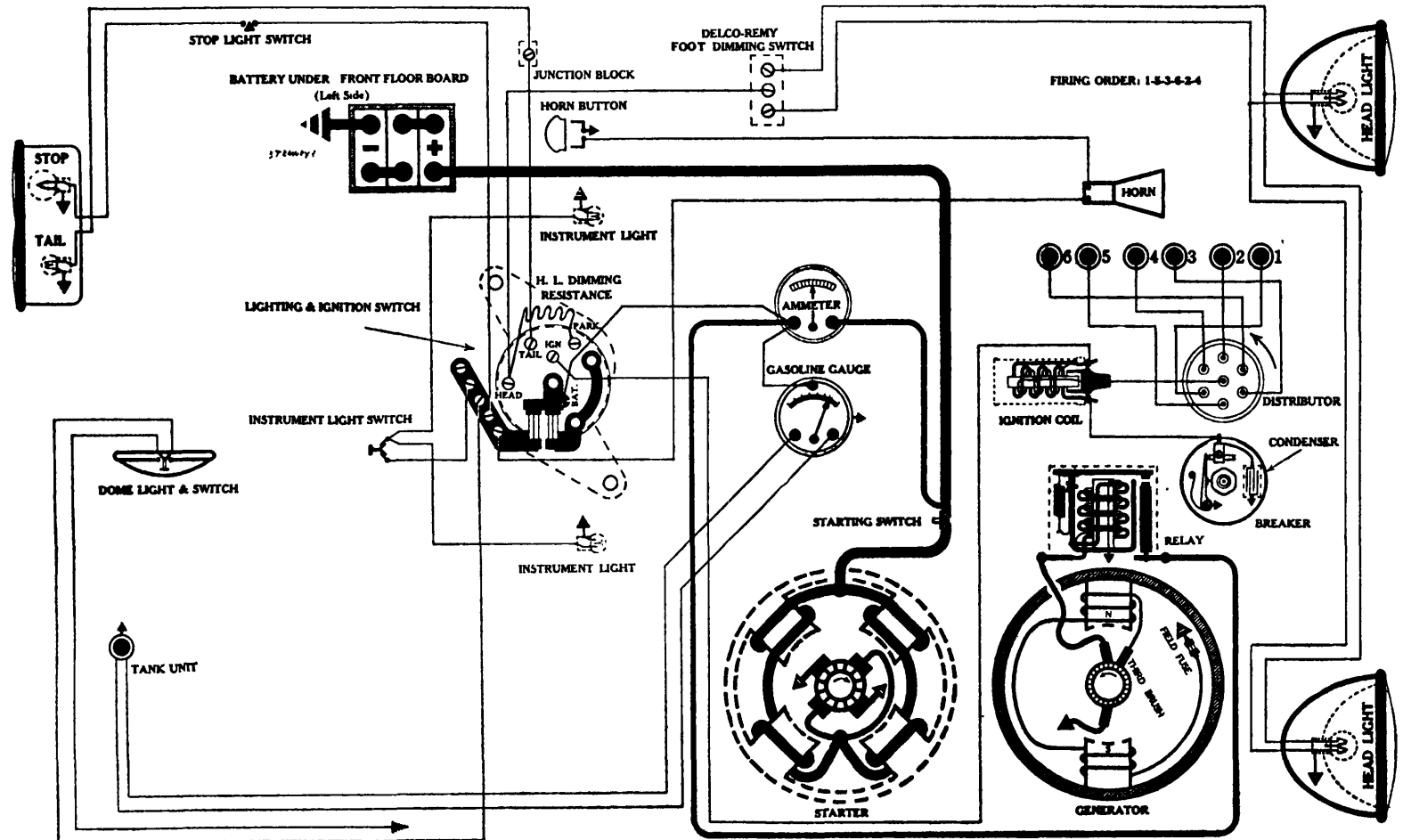
Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
	VELIE			Serial Number on end of front seat, also on extreme right front end of frame. (Continental Motor.)			
635		1924	6-56		West. Frame 711	West. Frame 35 AT, 36 1PT	West.
636		1923-24	6-58		West. Frame 711	West. Frame 35 AT	West.
719	Early	1925	60		Westinghouse Frame 711 No. 301210-B	Westinghouse Frame 36-DT No. 395228-C	Westinghouse Dist. JA No. 395315-A
720	Late	1925	60	144100 and up	Remy 720-G	Remy 917-W	Remy 636-D
795		1926	60		Remy 720-P	Remy 917-W	Remy 637-H
894		1927	Standard 50	160101 and up	Auto-Lite MN-4119	Auto-Lite GTB-4201	Auto-Lite IG-4146
895		1927	Special 60	150990 and up	Delco-Remy 720-P	Delco-Remy 941-R	Delco-Remy 637-P
966		1928	66		Auto-Lite MN-4119	Auto-Lite GTB-4103	Auto-Lite IGA-4025
967		1928	77		Delco-Remy 720-P	Delco-Remy 941-R	Delco-Remy 633-A
968	(Lycom.)	1928	88	Car production discontinued 1928	Delco-Remy 720-Y	Delco Remy 949-A	Delco-Remy 657-B
1029	VIKING	1929-30	FV-8 V-30	3001 and up Production discontinued 1930	Delco-Remy 725-H	Delco-Remy 955-R	Delco-Remy 658-T
	WESTCOTT			Serial Number on plate on dash under hood. (Continental Motor.)			
721		1923-25	B-44, C-44 (23 21) Mod. 60 (1924)	Car production discontinued 1926	Delco Mod. 181, 278	Delco Mod. 258	Delco No. 5256
	WHIPPET (Formerly Overland)			Serial Number on right rear frame			
866		1927	4 cyl. Model 96		Auto-Lite MO-4105	Auto-Lite GTB-4101	Auto-Lite IG-4036-E
867		1927	6 cyl. Model 93		Auto-Lite MN-4104	Auto-Lite GP-4105	Auto-Lite IG-4116-B
969		1928	4 cyl. Model 96	110345 and up	Auto-Lite MZ-4001	Auto-Lite GAL-4102	Auto-Lite IGB-4001-A
970		1928	6 cyl. Model 98	10001 and up	Auto-Lite MZ-4011	Auto-Lite GAL-4106	Auto-Lite IGB-4009
1030		1929-30	4 cyl. Model 96-A	1929-321001 to 435092 1930-453093 and up	Auto-Lite MZ-4001	Auto-Lite GAL-4116	Auto-Lite IGB-4020-A
1031		1929-30	6 cyl. Model 98-A	52001 to 109335 109336 and up Production discontinued 1931	Auto-Lite MZ-4011	Auto-Lite GAL-4106	Auto-Lite IGB-4021
	WILLS-ST. CLAIRE						
722		1925	W-6		Delco Model 310	Delco Model 311	Delco No. 5280
796		1924-26	B, C-68		Delco MG Model 207	Delco MG Model 207	Delco No. 5235
896		1926	W-6		Delco Model 321	Delco Model 311	Delco No. 5289
896		1927	T-6	Car production discontinued late 1926	Delco-Remy 732-C	Delco Model 357	Delco No. 5280
	WILLYS						
1095		1930	Six, 98-B	Starting Jan. 1930 131001 to 154843	Auto-Lite MAJ-4002	Auto-Lite GAL-4131	Auto-Lite IGB-4032
1096		1930	8-80 Straight Eight	Starting April 1930 1001 and up	Auto-Lite MAB-4031	Auto-Lite GAL-4131	Auto-Lite IGH-4013
1156		1931	97 and 98-D 6 cyl.	Starting Nov. 1930 1001 to 4606	Auto-Lite MZ-4024	Auto-Lite GAI-4331	Auto-Lite IGB-4032
1157		1931	8-80D Straight Eight	Starting Dec. 1930 1001 to 2617	Auto-Lite MAB-4035	Auto-Lite GAI-4331	Auto-Lite IGH-4013
1213		1932	6-90 6 cyl.	1001 and up	Auto-Lite MZ-4024	Auto-Lite GAI-4331	Auto-Lite IGE 4032
1214		1932	8-88 Straight Eight	1001 and up	Auto-Lite MAB-4035	Auto-Lite GAI-4331	Auto-Lite IGH-4013
1276		1933	77 4 cyl.	1001 and up	Auto-Lite MZ-4033	Auto-Lite GAM-4504	Auto-Lite IGB-4078
1277		1933	99 6 cyl.		Auto-Lite MAJ-4029	Auto-Lite GAI-4331	Auto-Lite IGB-4032-A

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Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
WILLYS-KNIGHT							
637		1923-24	64-67		Auto-Lite Model MH	Auto-Lite Model GJ	Auto-Lite IG-4036-B
723		1925	4-65		Auto Lite MH-4101	Auto Lite GJ-4105	Auto Lite IG-4036-B
724		1925	6-66		De' Jon SB-4008	De' Jon DB-4003	Auto Lite IA-4010
797		1926	66		Auto-Lite ML-4105	Auto-Lite GJA-4109	Auto-Lite IG-4107
798		1926	70		Auto-Lite ML-4106	Auto-Lite GY-4103	Auto-Lite IG-4107-B
897		1927-28	66-A Great Six		Auto-Lite ML-4105	Auto-Lite GRE-4201A- GRE-4207A	Auto-Lite IG-4181
898		1927-28	70-A Special Six		Auto-Lite ML-4106	Auto-Lite GYA-4202	Auto-Lite IG-4107B
971		1928	Standard Six 56		Auto-Lite MAB-4002	Auto-Lite GAL-4103	Auto-Lite IGA-4042
1032		1929-30	66-B		North East SBH-6585	North East LB-6580	North East TBU-10877
1033		1929-30	70-B	1929-43001 and up 1930-110366 and up	Auto-Lite MAB-4014	Auto-Lite GAL-4103	Auto-Lite IGC-4004
1158		1931-32	66-D	C-100 and up	Auto-Lite MAB-4018	Auto-Lite GAG-4130	Auto-Lite IGC-4052
1215		1932	95 6 cyl.	1001 and up Production discontinued 1933	Auto-Lite MAD-4115	Auto-Lite GAL-4303	Auto-Lite IGC-4045-A
WINDSOR							
1034		1929-30	8-82 & 8-92	Fedco System	Delco-Remy 724-J	Delco-Remy 940-N	Delco-Remy 658-H
1097		1930	6-72 and 6-77	Production discontinued 1931	Delco-Remy 714-G	Delco-Remy 949-V	Delco-Remy 640-F

WILLYS-KNIGHT

Model 56, (Standard Six), (1928)

**BATTERY**

U. S. L., 3-HVX-7X, 6 volts. Negative Terminal Grounded
 Starting Capacity—148 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 28 hours.
 Box—Length, 11 $\frac{3}{4}$; width, 7 $\frac{7}{16}$; height, 9 $\frac{3}{4}$ inches.

STARTER

Rotation, R. H., Com. End
 Auto-Lite, MAB-4002

Connection to Engine—Bendix drive.
 Running Free—60 amps. at 6 volts.
 Cranking Engine—160-170 amps. at 5 volts.
 Lock Torque—17 pound-feet, 520 amps. at 3 volts.
 Brush Spring Tension—24-28 oz. on each.
 Starting Switch—Auto-Lite, SW-4001.

IGNITION

Rotation, L. H., Top View
 Auto-Lite, Dist. Type IGA-4042

Breaker—Contact separation .020 to .024 inch.
 Contact Spring Tension—18-20 oz.
 Timing—See detailed instructions P. 1, Sec. AA.
 1—Locate T. D. C. 2—Locate rotor. 3—Set spark.
 Spark Plugs— $\frac{7}{8}$ inch regular; Gap .025 inch.
 Firing Order—1-5-3-6-2-4.
 Manual Advance—20 degrees (on Flywheel).
 Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0-1	300	0-5
1300	8	650	4
2000	16	1000	8
2400	20	1200	10

 Coil—Auto-Lite, IG-4065.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, Type GAL-4103

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
2	620	6.6
5	700	7.
10	860	7.3
14	1050	7.7
16	1200	7.9

Maximum Charging Rate (cold)—19 amps. at 8 volts or 17.75 amps. at 7.5 volts.

Motoring Freely—5 amps. at 6 volts.

Max. Stall Current—18 amps. at 6 volts.

Field Test—4.3 amps. at 6.2 volts directly across field coils in series.

Field Fuse—5 amps.

Brush Spring Tension—1 $\frac{1}{4}$ -1 $\frac{1}{2}$ lbs. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4007

Closes—7-7.5 volts.

Opens— $\frac{1}{2}$ -2 $\frac{1}{2}$ amps. discharge.

Contact Gap—.025-.035 inch.

Core Gap—.010-.030 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton.

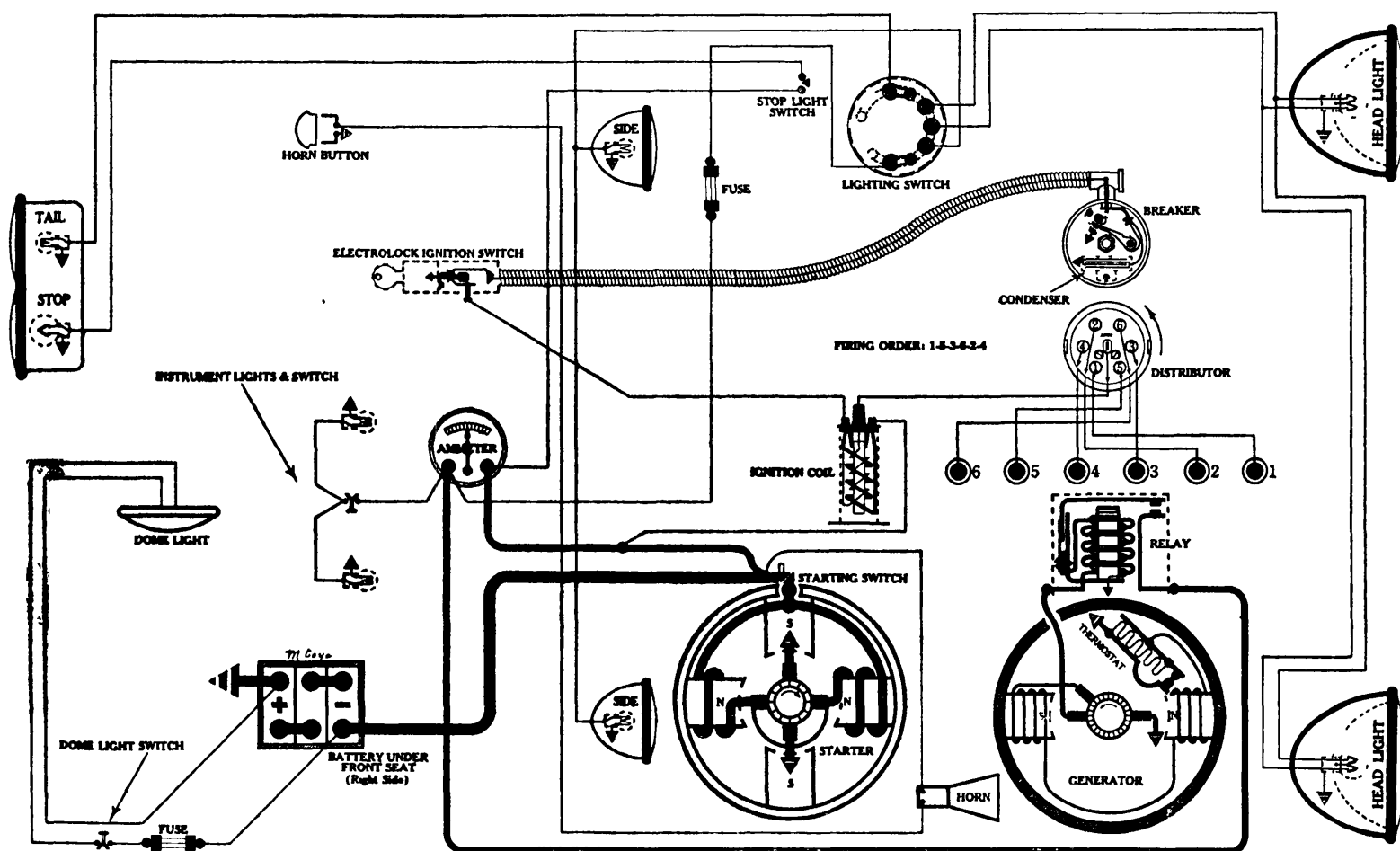
Fuses—Two, 20 amp. fuses mounted on switch back.

Foot Dimming Switch—Delco-Remy, 465-B.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal);
 TAIL—63; INSTRUMENT—63; DOME—81; STOP—87.

AUBURN

M del 80, (1929)



BATTERY

U. S. L., XY-13-X-6, 6 volts. Positive terminal grounded

Starting Capacity—102 amps. for 20 minutes.

Lighting Capacity—5 amps. for 17½ hours.

Box—Length, 9 1/16; width, 7¼; height, 9¼ inches.

STARTER

Rotation, R. H., Com. End

Delco-Remy, 716-C

Connection to Engine—Bendix drive

NOTE Gear reduction j. b. A 14 T. pinion cut on armature shaft drives 22 T. pinion on Bendix shaft

Running Free—50 amps. at 5 volts, 4000 R. P. M.

Cranking Engine—175-180 amps. at 4.5 volts.

Lock Torque—14 pound-feet, 350 amps., 3.2 volts.

Brush Spring Tension—24-26 oz. on each.

Starting Switch—Mounted on Starter.

IGNITION

Rotation, L. H., Top View

Delco-Remy, 641-A

Breaker—Contact separation .024 inch.

Contact Spring Tension—18-20 oz.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—7/8 in. regular; Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel).

Eng. R P M	Degrees Advance (on flywheel)	Dist. R P M	Degrees Advance (on cam)
400	0	200	0
800	4	400	2
1200	8	600	4
1600	12	800	6
2000	16	1000	8
2400	20	1200	10
2600	22	1300	11

Coil—Delco-Remy, 525-C.

Ignition Switch—"Electrolock", Type A. For theory of

operation and instructions on servicing see P. 17, Sec AA.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 949-C

Performance Data—Gen cold Thermostat closed.

Amps.	R.P.M	Volts
0	575	6.5
3	700	7.
6	800	7.1
11	1000	7.9
15	1200	8.1
20	1450 (Max)	8.3
19	1700	8.3

NOTE Thermostat opens about 165° F, reducing charging rate approx 30-40%

Motoring Freely—5-5½ amps. at 6 volts.

Max. Stall Current—18-20 amps at 6 volts.

Field Test—4.75-5 amps at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz on each

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA

RELAY

Delco-Remy, No. 265-B

Closes—7-7½ volts.

Opens—0-2½ amps. discharge

Contact Gap—.015-.025 inch

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Soreng Manegold, 5650A.

Location—Foot of steering column Lights controlled by lever on steering wheel

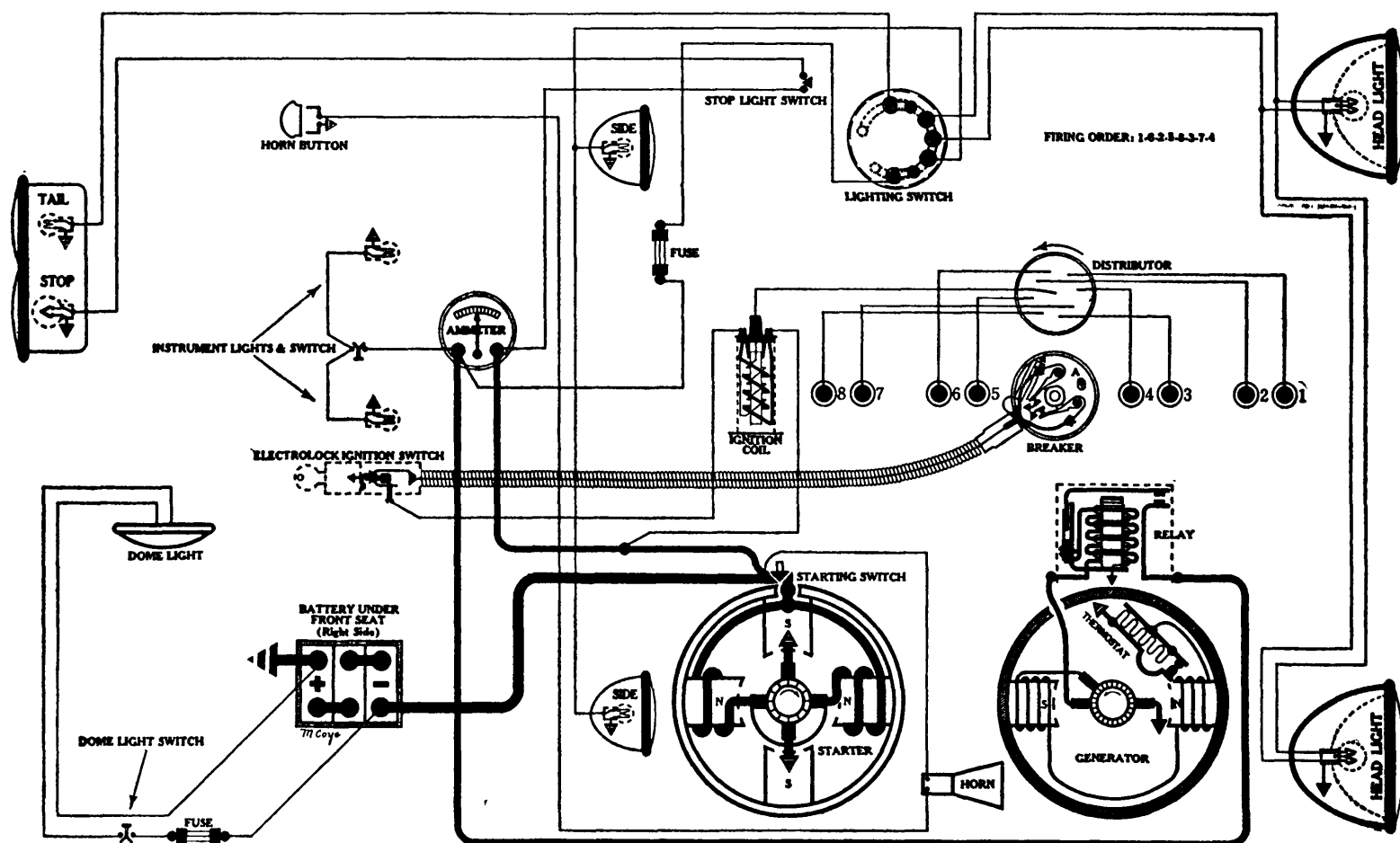
Fuses (Lighting)—Single, 20 amp. located behind instrument board, left side.

Fus (Body Lights)—Single 10 amp located in battery compartment under front seat, right side

Lamps—See P. 3, Sec. AA HFAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; TAIL—63; STOP—87.

AUBURN

Model 90, (1929)

**BATTERY**

U. S. L., XY-13-X-6, 6 volts. Positive terminal grounded
Starting Capacity—102 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17½ hours.
Box—Length, 9 1/16; width, 7¼; height, 9¼ inches.

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 716-C

Connection to Engine—Bendix drive.

NOTE: Gear reduction job. A 14 T. pinion cut on armature shaft drives 22 T. pinion on Bendix shaft.

Running Free—50 amps. at 5 volts, 4000 R. P. M.

Cranking Engine—175-180 amps. at 4.5 volts.

Lock Torque—14 pound-feet, 350 amps., 3.2 volts.

Brush Spring Tension—24-26 oz. on each.

Starting Switch—Remy, 406-A.

IGNITION

Rotation, L. H., Top View
 Delco-Remy, 657-E

IMPORTANT NOTE: This unit uses a four-lobe cam with two breaker arms connected in parallel. Cam is so designed that one point is open when other is just breaking but closes few degrees after break occurs. The arms must be accurately synchronized to operate at intervals of exactly 45 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw "A" is provided, which moves one breaker assembly. Adjust by using Delco-Remy synchronizing tool No. 820788 or rotary spark gap on test bench. See detailed instructions P. 13, Sec. AA.

Breakers—Contact separation .022 inch.

Contact Spring Tension—15-20 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—⅞ inch regular; Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—15 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
300	0-0	150	0-0
1000	2.5-6.5	500	1-3
1800	13-17	900	6.5-8.5

Coil—Delco-Remy, 525-C.

Ignition Switch—"Electrolock", Type A. For theory of operation and instructions on servicing see P. 17, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 949-C

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts
0	575	6.5
3	700	7.
6	800	7.1
11	1000	7.9
15	1200	8.1
20	1450 (Max.)	8.3
19	1700	8.3

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5½ amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4.75-5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 27, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7½ volts.

Opens—0-2½ amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Soreng Manegold, 5650A.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

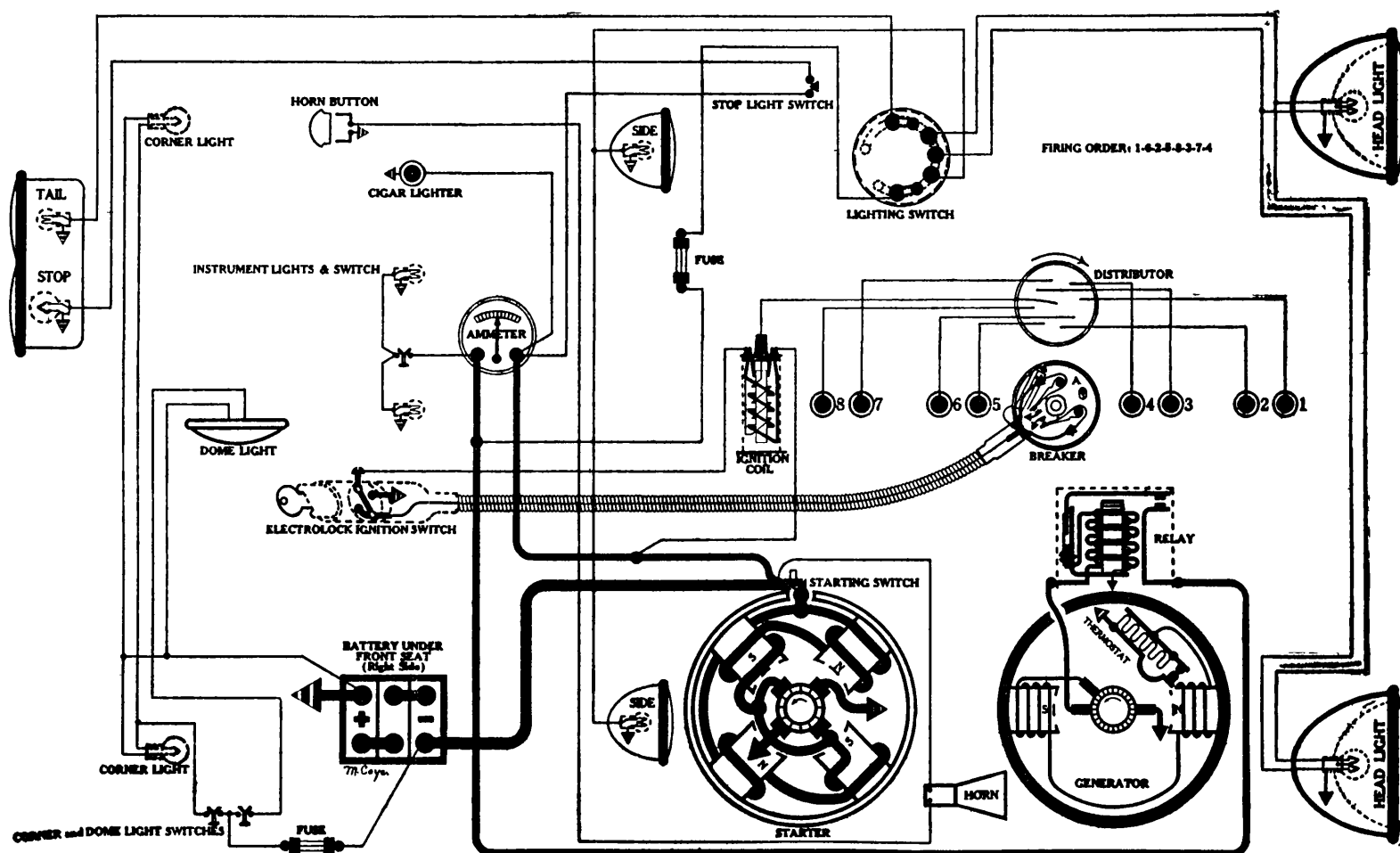
Fuses (Lighting)—Single, 20 amp. located behind instrument board, left side.

Fuse (Body Lights)—Single 10 amp. located in battery compartment under front seat, right side.

Lamps—See P. 3, Sec. AA. **HEAD**—1110 (Bifocal); **SIDE**—63; **INSTRUMENT**—63; **TAIL**—63; **STOP**—87.

AUBURN

Model 120, (1929); Model 125, (1930)

**BATTERY**

U. S. L., XY-15-X-6, 6 volts. Positive terminal grounded

Starting Capacity—119 amps. for 20 minutes.

Lighting Capacity—5 amps. for 21 hours.

Box—Length, 10 7/16; Width, 7 1/4; Height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 718-A

Connection to Engine—Bendix drive.

Running Free—65 amps. at 5 volts, 6000 R. P. M

Cranking Engine—160-175 amps. at 4.3 volts.

Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.

Brush Spring Tension—24-28 oz. on each.

Starting Switch—Mounted on starter.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 657-L

IMPORTANT NOTE This unit uses a four lobe cam with two breaker arms connected in parallel. Cam is so designed that one point is open when other is just breaking but closes few degrees after break occurs. The arms must be accurately synchronized to operate at intervals of exactly 45 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw "A" is provided which moves one breaker assembly. Adjust by using Delco-Remy synchronizing tool No. 820738 or rotary spark gap on test bench. See detailed instructions P. 13, Sec. AA.

Breakers—Contact separation .022 inch

Contact Spring Tension—15-20 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—7/8 inch regular; Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist R.P.M.	Degrees Advance (on cam)
500	0-2	250	0-1
1000	6-8	500	3-4
2000	14-16	1000	7-8
2600	18-20	1300	9-10

Coil—Delco-Remy, 525-C.

Ignition Switch—"Electrolock", Type 9-A. For theory of operation and instructions on servicing see P. 21, Sec. AA.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 955-J

Performance Data—Gen. cold. Thermostat closed.

Amps	R.P.M.	Volts
0	575	6.5
3	700	7.
6	800	7.1
11	1000	7.9
15	1200	8.1
20	1450 (Max)	8.3
19	1700	8.3

NOTE Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series

Brush Spring Tension—16-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-F

Closes—7-7 1/2 volts.

Opens—0-2 1/2 amps. discharge.

Contact Gap—.015-.025 inch

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Soreng Manegold, 5650A.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

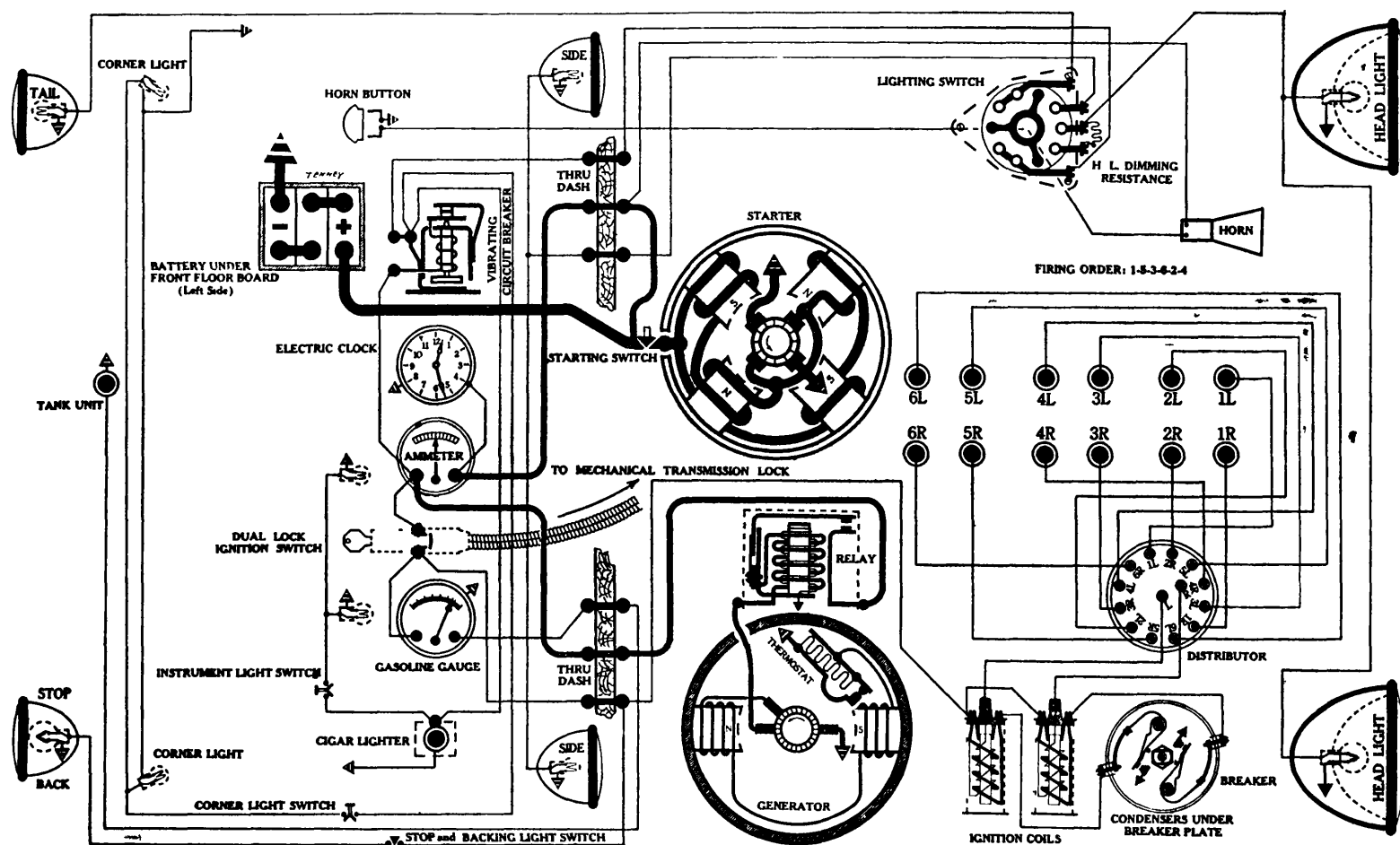
Fuses (Lighting)—Single 20 amp. located behind instrument board, left side.

Fuse (Body Lights)—Single 10 amp. located in battery compartment under front seat, right side.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; TAIL—63; STOP—87.

BLACK HAWK

Series L, 6 cyl., (1929-30)



BATTERY

Prest-O-Lite, A-6-17-SF, 6 volts. Negative Terminal Grounded

Starting Capacity—170 amps. for 20 minutes.

Lighting Capacity—5 amps. for 32 hours.

Box—Length, 13; width, 7; height, 9 $\frac{3}{8}$ inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 726-C

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—65 amps. at 5 volts, 6000 R. P. M.

Cranking Engine—160-175 amps. at 4.3 volts.

Lock Torque—15 pound-feet, 570 amps. at 3.1 volts

Brush Spring Tension—24-28 oz. on each.

Starting Switch—Mounted on starter.

IGNITION

Rotation, R. H., Top View
Delco-Remy, Dist. 4043

IMPORTANT NOTE This unit has a six-lobed cam with two sets of breaker points electrically separate. Two independent condensers are used, as well as two coils.

Breakers—Contact separation .018 to .020 inch.

Contact Spring Tension—18-22 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Firing Order—1-5-3-6-2-4.

Spark Plugs—Metric (heavy electrodes); Gap .025 inch.

Manual Advance—35 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist R.P.M.	Degrees Advance (on cam)
400	0	200	0
800	4	400	2
1200	8	600	4
1600	12	800	6
2000	16	1000	8
2400	20	1200	10
2600	22	1300	11

Coils—Delco-Remy, 527-A, 528-C.

Ignition Switch—Delco-Remy, 426-J and K "Dual Lock". (Combination Ignition Switch and Mechanical Transmission Lock).

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 949-H

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5 $\frac{1}{2}$ amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 $\frac{3}{4}$ to 5 $\frac{1}{2}$ amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7 $\frac{1}{2}$ volts.

Opens—0-2 $\frac{1}{2}$ amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-G.

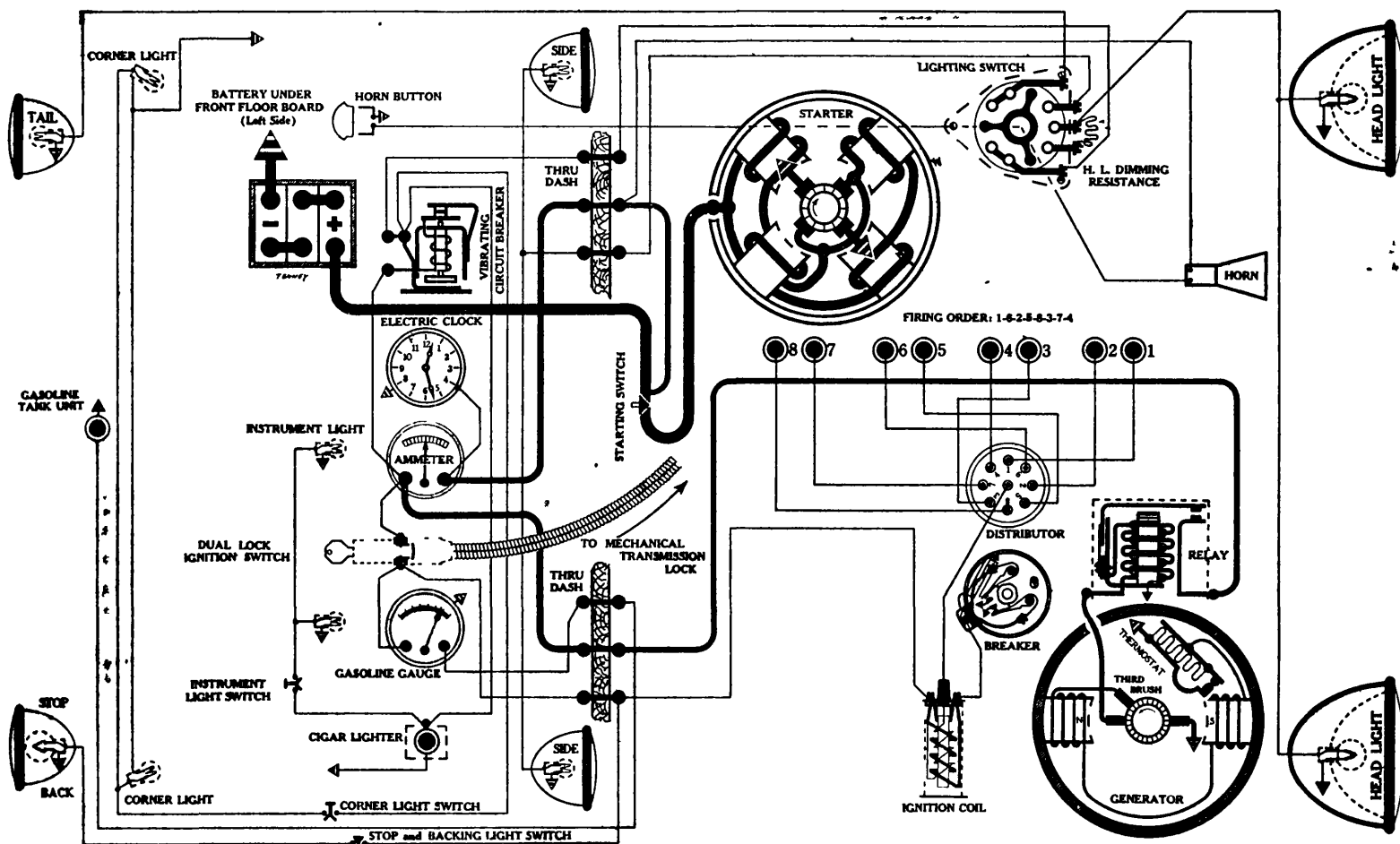
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C, starts 25-30 amps. Operates 10-15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1129; SIDE—81; INSTRUMENT—63; CORNER—1129; TAIL—63; STOP—1129.

BLACK HAWK

Series L, 8 cyl., (1929-30)



BATTERY

Prest-O-Lit, A-6-17-SF, 6 volts. Negative terminal grounded

Starting Capacity—170 amps. for 20 minutes

Lighting Capacity—5 amps. for 32 hours.

Box—Length, 13; width, 7; height, 9 5/8 inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 724-J

Connection to Engine—Bendix drive.

NOTE Gear reduction job Pinion cut on armature shaft drives pinion on Bendix shaft

Running Free—70 amps. at 5 volts, 3500 R. P. M.

Cranking Engine—160-170 amps. at 4.6 volts.

Lock Torque—22 pound-feet, 600 amps., 3 volts.

Brush Spring Tension—24-28 oz. on each.

Starting Switch—Delco-Remy, 406-A.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 658-U

IMPORTANT NOTE This unit uses a four-lobe cam with two breaker arms connected in parallel. Cam is so designed that one point is open when other is just breaking but closes few degrees after break occurs. The arms must be accurately synchronized to operate at intervals of exactly 45 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw "A" is provided which moves one breaker assembly. Adjust by using Delco-Remy synchronizing tool No. 820738 or rotary spark gap on test bench. See detailed instructions P. 13, Sec. AA.

Breaks—Contact separation .022 inch.

Contact Spring Tension—17-21 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Firing Order—1-6-2-5-8-3-7-4.

Spark Plugs—Metric (heavy electrodes); Gap .025 inch.

Manual Advance—22 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist R.P.M.	Degrees Advance (on cam)
600	0-2	300	0-1
1000	4	500	2
1500	8	750	4
2500	16	1250	8
3200	18-20	1600	9-10

Coil—Delco-Remy, 528-C.

Ignition Switch—Delco-Remy, 426-J or 426-K, "Dual Lock."

(Combination Ignition Switch and Mechanical Transmission Lock).

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 944-N

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts
0	500	6.5
4	700	7
8	800	7.2
12	1000	7.8
16	1200	8
19	1300 (Max)	8.3
18	1600	8.3

NOTE: Thermostat opens about 165° F, reducing charging rate approx 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7 1/2 volts.

Opens—0-2 1/2 amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-G.

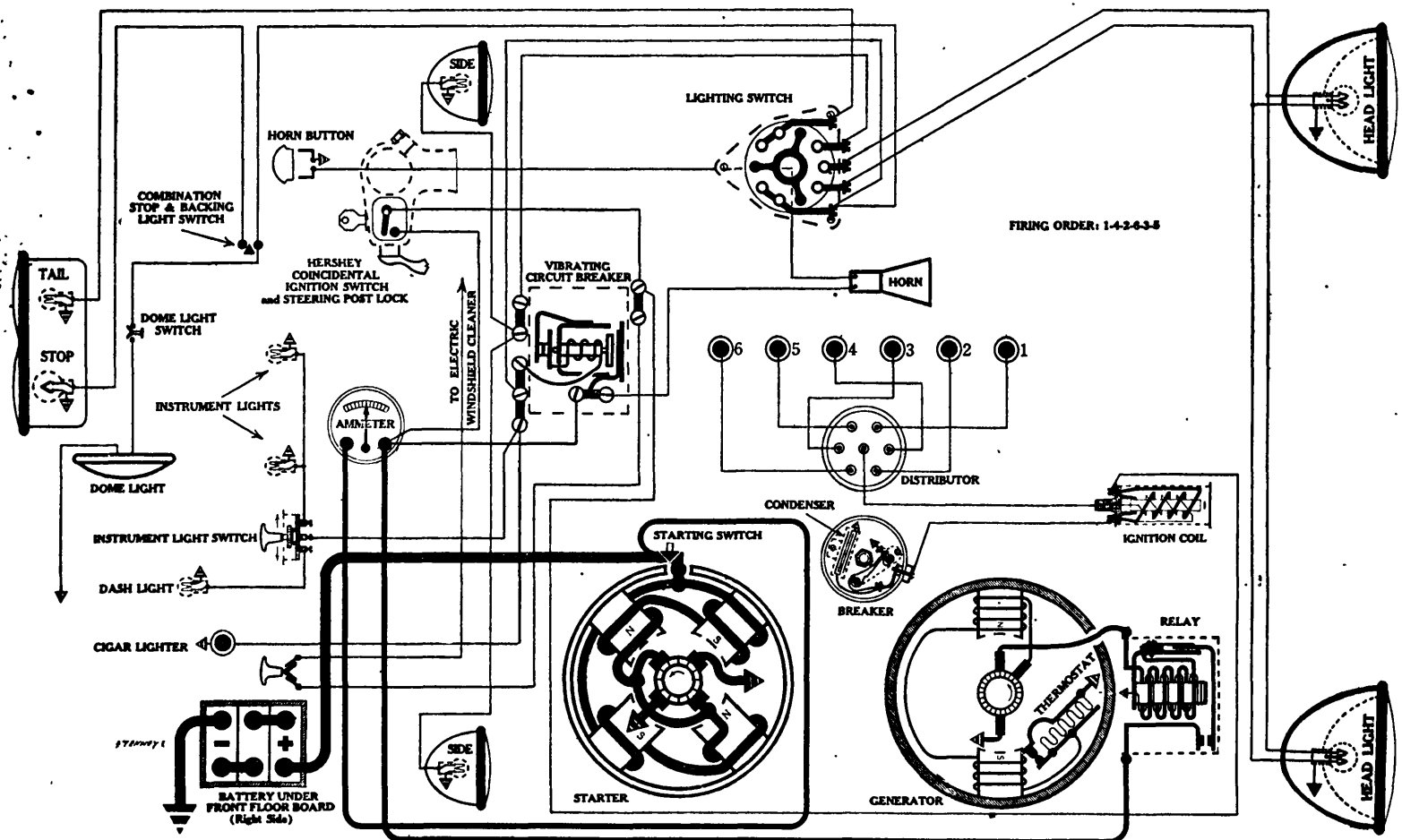
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C, starts 25-30 amps. Operates 10-15 amps

Lamps—See P. 3, Sec. AA. HEAD—1129; SIDE—81; INSTRUMENT—63; CORNER—1129; TAIL—63; STOP—1129.

BUICK

Mod ls 116, 121, 129, (1929)



BATTERY

Exide, 3 MXV-13-1R, 6 volts. Negative Terminal Grounded
Starting Capacity—114 amps. for 20 minutes.

Lighting Capacity—5 amps. for 20 hours.

Box—Length, 9 1/16; width, 7 1/8; height, 9 11/32 inches.

Exide, 3 MXV-15-1R. (Used in Models 121 and 129)

Starting Capacity—133 amps. for 20 minutes.

Lighting Capacity—5 amps. for 26 1/2 hours.

Box—Length, 10 3/16; width, 7 1/8; height, 9 11/32 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 725-D

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R. P. M.

Cranking Engine—165-185 amps. at 4.2 volts.

Lock Torque—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 640-J

Breaker—Contact separation .018 inch.

Contact Spring Tension—17-21 oz.

Timing—See detailed instructions P. 1, Sec. AA.

NOTE: (Engine timed with spark fully advanced. Set spark on 17 degree Flywheel mark.)

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—Regular Metric (AC type G); Gap .025 inch.

Firing Order—1-4-2-6-3-5.

Manual Advance—24 degrees (on Flywheel).

Automatic Advance—26 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
450	0-2	225	0-1
800	10-12	400	5-6
1200	14-16	600	7-8
1800	20-22	900	10-11
2200	24-26	1100	12-13

Coil—Delco-Remy, 528-H.

Switch—Hershey "Coincidental" — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 940-M

Performance Data—Gen cold. Thermostat closed.

Amps.	R.P.M.	Amps.	R.P.M.
0.....	450	12.....	1000
5.....	700	14.....	1200
10.....	850	18-20 (Max.) ..	1300

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5.5 amps. at 6 volts.

Max. Stall Current—19 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—22-26 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7-7 1/2 volts.

Opens—0-3 amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch. Contacts closed.

LIGHTING

Switch—Delco-Remy, 484-A.

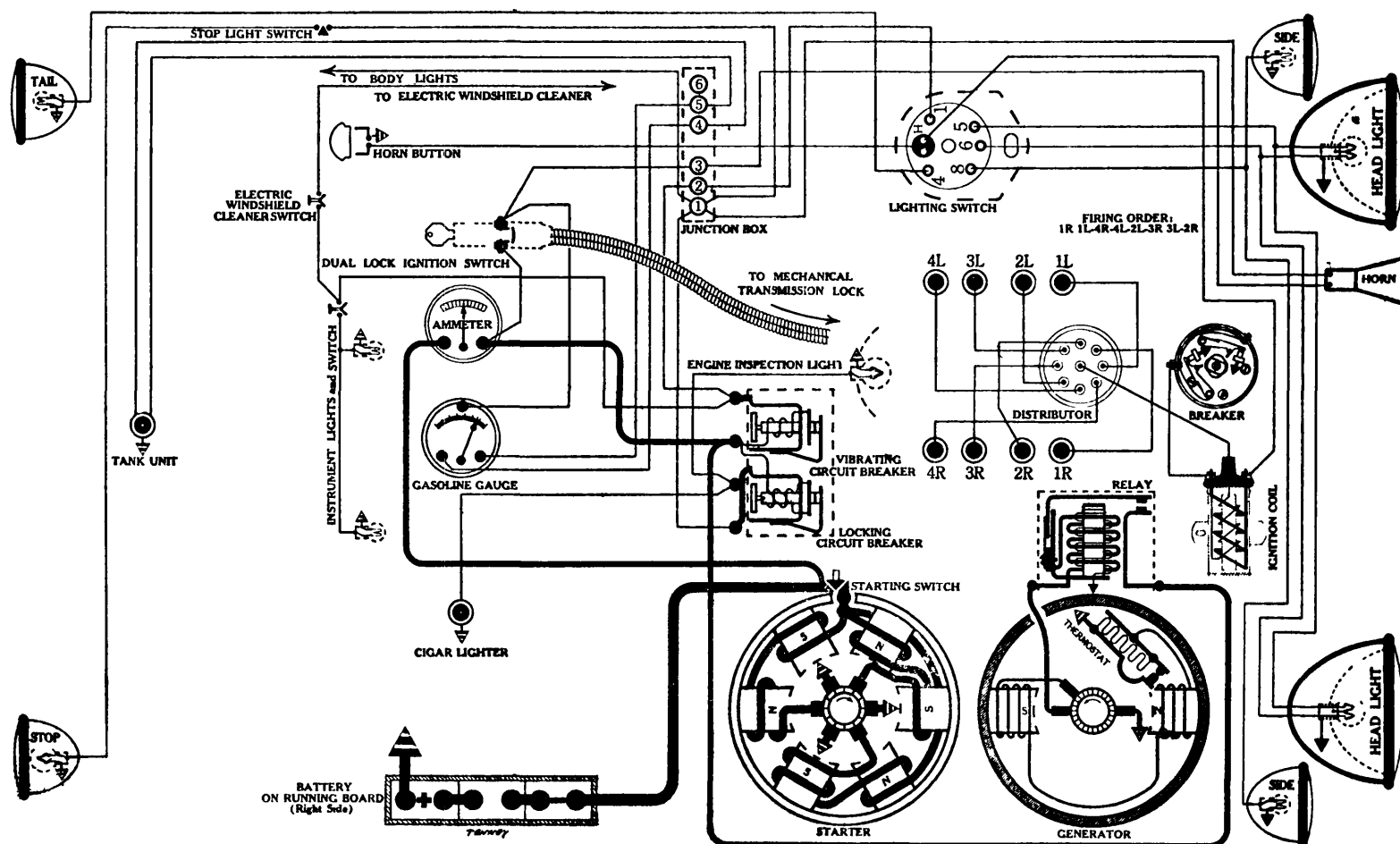
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy 410-D. Starts 25-30 amps. Operates 10-15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1-110 (Bifocal); SIDE—63; TAIL—63; TONNEAU LAMP—63; INSTRUMENT (direct and indirect)—63; DOME—81.

CADILLAC

Model 341-B, (1929)



BATTERY

Exide, 3-LXV-15-2G, 6 volts. Positive Terminal Grounded
Starting Capacity—137 amps. for 20 minutes.
Lighting Capacity—5 amps. for 26 hours.
Box—Length, 20 7/16; width, 5 1/2; height, 8 3/4 inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 382

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.
Running Free—70 amps. at 5 volts, 3000 R. P. M.
Cranking Engine—245-260 amps. at 4 volts.
Lock Torque—19 pound-feet, 500 amps. at 3 volts.
Brush Spring Tension—20-24 oz. on each.
Starting Switch—Mounted on starter motor.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 4041 or 4042

IMPORTANT NOTE This unit uses a four-lobed cam with double breaker arms connected in parallel. Cam is so designed that one point is open when other is just breaking, the two sets of breakers must be accurately located to operate at intervals of exactly 45 degrees of distributor shaft travel, corresponding to 90 degrees of flywheel. An eccentric adjusting screw is provided which moves but one breaker assembly, after loosening screws. An accurate adjustment may be made by use of calibrated template—see P. 9, Sec. AA.—or by use of special designed breaker gauge supplied by Delco-Remy Corp.

Breakers—Contact separation .025 to .027 inch.

Contact Spring Tension—16-20 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T D C 2—Locate rotor 3—Set spark
 Special Time Ign with full advance on spark lever. With No. 1 cylinder in firing position. Flywheel mark "IG/A 1/5" will be at indicator on crank case.

Firing Order—1L-4R-4L-2L-3R-3L-2R-1R.

Spark Plugs—7/8" Semi-Aircraft (AC type Y); Gap .025 inch.

Manual Advance—38 degrees (on Flywheel).

Automatic Advance—30 degrees (on Flywheel).

Eng RPM	Degrees Advance (on fly wheel)	Dist RPM	Degrees Advance (on cam)
1000	0 2	500	0-1
1500	6 6	750	3-4
2500	14 16	1250	7-8
3000	22 24	1500	11-12
3800	28 30	1900	14-15

Coil—Delco-Remy 2195.

Ignition Switch—Delco-Remy, 426-A or 426-E, "Dual Lock" (Combination Ignition Switch and Mechanical Transmission Lock).

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 384
 (Same as LaSalle 1929)

RELAY

Delco-Remy, 266-N

Closes—7-7 1/2 volts

Opens—0-2 amps discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-D.

Location—Foot of Steering Column. Lights controlled by lever on steering wheel.

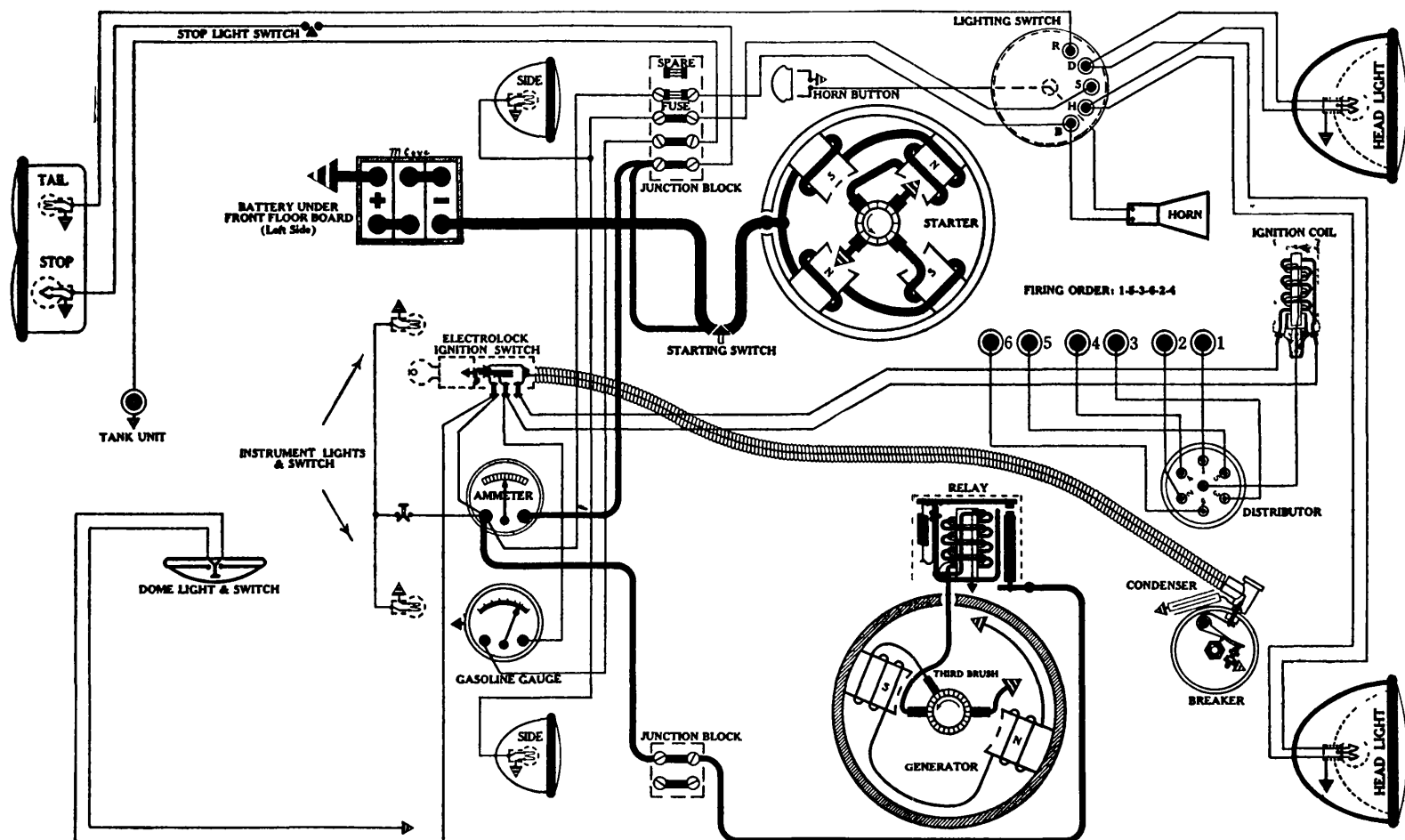
Circuit Breaker—Delco-Remy 5759.

Vibrating—Starts 25-30 amps. Operates 10-15. Lock-Out—Starts 25-30 amps. Operates with discharge less than 1 ampere.

Lamps—See P. 3, Sec. AA. **HEAD**—1110 (Bifocal); **FENDER**—63; **STOP**—87; **TAIL**—63; **ENGINE INSPECTION**—1129.

CHANDLER

Model 65, (1929)

**BATTERY**

Prest-O-Lite, A-6-13-J, 6 volts. Positive Terminal Grounded
 Starting Capacity—102 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 17 hours.
 Box—Length, 9; width, 7; height, 9 $\frac{1}{8}$ inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MZ-4015

Connection to Engine—Bendix drive.
 Running Free—70 amps. at 6 volts.
 Cranking Engine—160-170 amps. at 4.5 volts.
 Lock Torque—12 pound-feet, 525 amps., 3.75 volts.
 Brush Spring Tension—24-28 oz. on each.
 Starting Switch—Auto-Lite, SW4001.

IGNITION

Rotation, R. H., Top View
 Auto-Lite, Dist. IGB-4018

Breaker—Contact separation .020 to .024 inch.
 Contact Spring Tension—18-20 oz.
 Timing—See detailed instructions P. 1, Sec. AA.
 1—Locate T. D. C. 2—Locate rotor. 3—Set spark
 Spark Plugs— $\frac{7}{8}$ " long (AC type B); Gap .025 inch.
 Firing Order—1-5-3-6-2-4.
 Automatic Advance—14 degrees (on Flywheel).

Eng RPM.	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
450	0-2	225	0-1
800	4-6	400	2-3
1500	8-10	750	4-5
2100	14	1100	7

Coil—Aut -Lit , IG-4065.
 Ignition Switch—"Electrolock", type B. For theory of operation and instructions on servicing see P. 18, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAL-4115

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0	650	6.5
2	720	6.6
5	850	7
10	1075	7.3
14	1340	7.7
16	1800 (Max.)	8

Motoring Freely—5-5 $\frac{1}{2}$ amps. at 6 volts.
 Max. Stall Current—16-19 amps. at 6 volts.
 Field Test—4.7 amps. at 6 volts across field coils in series.
 Field Fuse—(None).
 Brush Spring Tension—20 to 24 oz. on each.
 Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

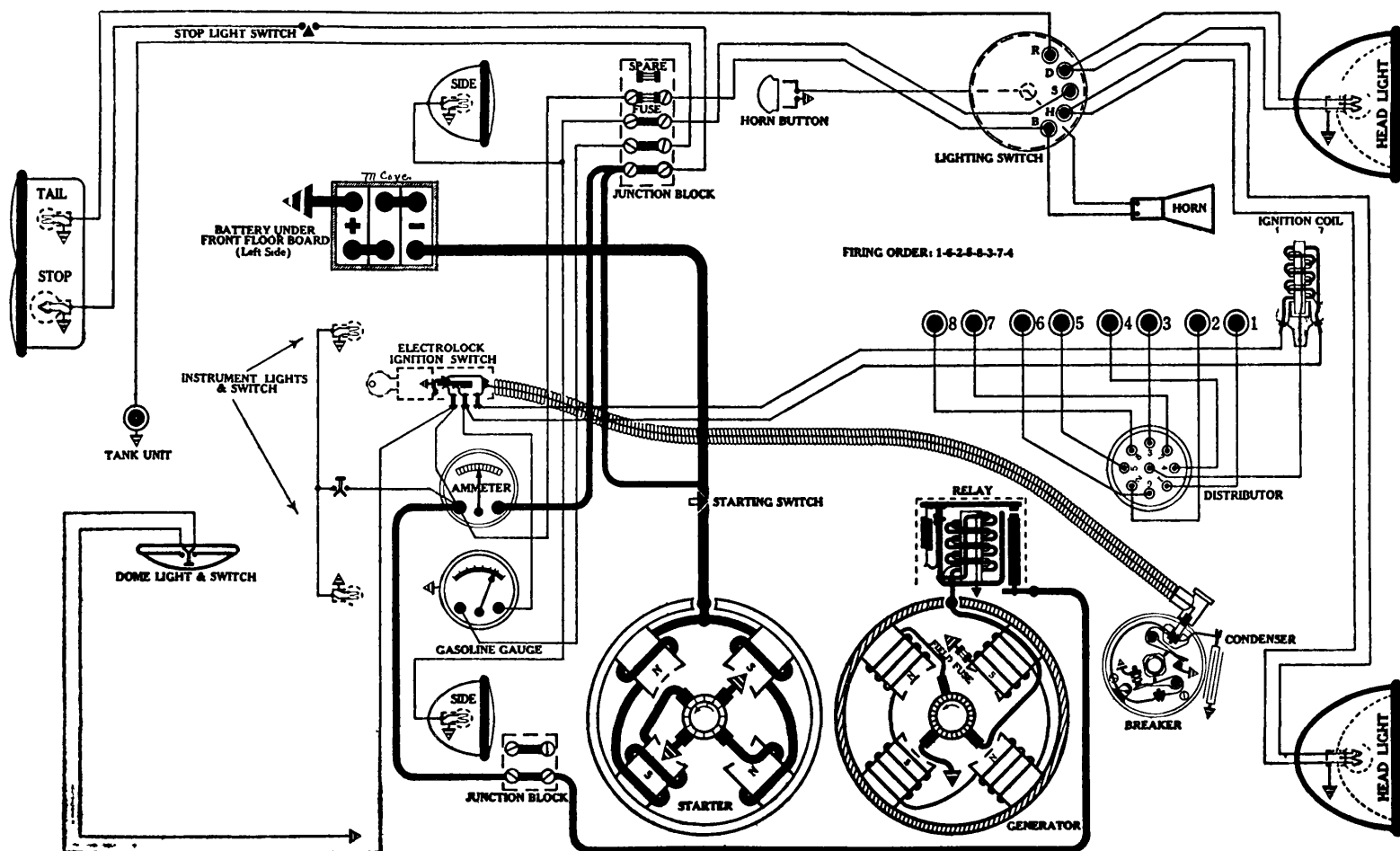
Closes—7-7.5 volts.
 Opens— $\frac{1}{2}$ -2 $\frac{1}{2}$ amps. discharge.
 Contact Gap—.025-.035 inch.
 Core Gap—.010-.030 inch, contacts closed.

LIGHTING

Switch—Clum, Type 10677.
 Location—Foot of steering column. Lights controlled by lever on steering wheel.
 Fuses—Single 20 amp. Fuse (with spare) on Junction Block, under hood left side.
 Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; DOME—81; TAIL—63; INSTRUMENT—63; STOP—87.

CHANDLER

Mod 1, 8-75, (1929)



BATTERY

Prest-O-Lite, A-6-15-J, 6 volts. Positive Terminal Grounded
Starting Capacity—120 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours
Box—Length, 10 5/16; width, 7; height, 9 1/8 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAD-4103

Connection to Engine—Bendix drive.
Running Free—50 amps. at 5.5 volts.
Cranking Engine—160 amps. at 5.25 volts, 228 R. P. M.
Lock Torque—13.6 pound-feet, 540 amps., 3 volts.
Brush Spring Tension—20 to 24 oz. on each.
Starting Switch—Auto-Lite, SW-4001.

IGNITION

Rotation, R. H., Top View
Auto-Lite, Dist. IGH-4001-A

IMPORTANT NOTE This unit uses a four-lobe cam with two breaker arms connected in parallel. Cam is so designed that one point is open when other is just breaking but closes few degrees after break occurs. The arms must be accurately synchronized to operate at intervals of exactly 45 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw is provided which moves one breaker point assembly. For detailed instructions on synchronizing see P. 25, Sec. AA.

Breaker—Contact separation .022 to .024 inch.

Contact Arm Spring Tension—18-20 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—7/8" long (AC type B); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—16 degrees (on Flywheel).

Automatic Advance—14 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	0-2	200	0-1
800	8	400	4
1200	12	600	6
1400	14	700	7

Coil—Auto-Lite IG-4065.

Ignition Switch—"Electrolock", type B For theory of operation and instructions on servicing, see P. 18, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAG-4113

Performance Data—Gen. cold.

Amps	RPM	Volts
0	525	6.5
2	550	6.6
5	650	7.
10	780	7.3
14	1200	7.7
17	1250 (Max)	8

Motoring Freely—5.5 1/2 amps. at 6 volts.

Max. Stall Current—17-19 amps. at 6 volts.

Field Test—4.3 amps. at 6 volts across field coils in series.

Field Fuse—5 amps.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7-7.5 volts.

Opens—1/2-2 1/2 amps. discharge.

Contact Gap—.025-.035 inch.

Core Gap—.010-.030 inch, contacts closed.

LIGHTING

Switch—Clum, Type 10677.

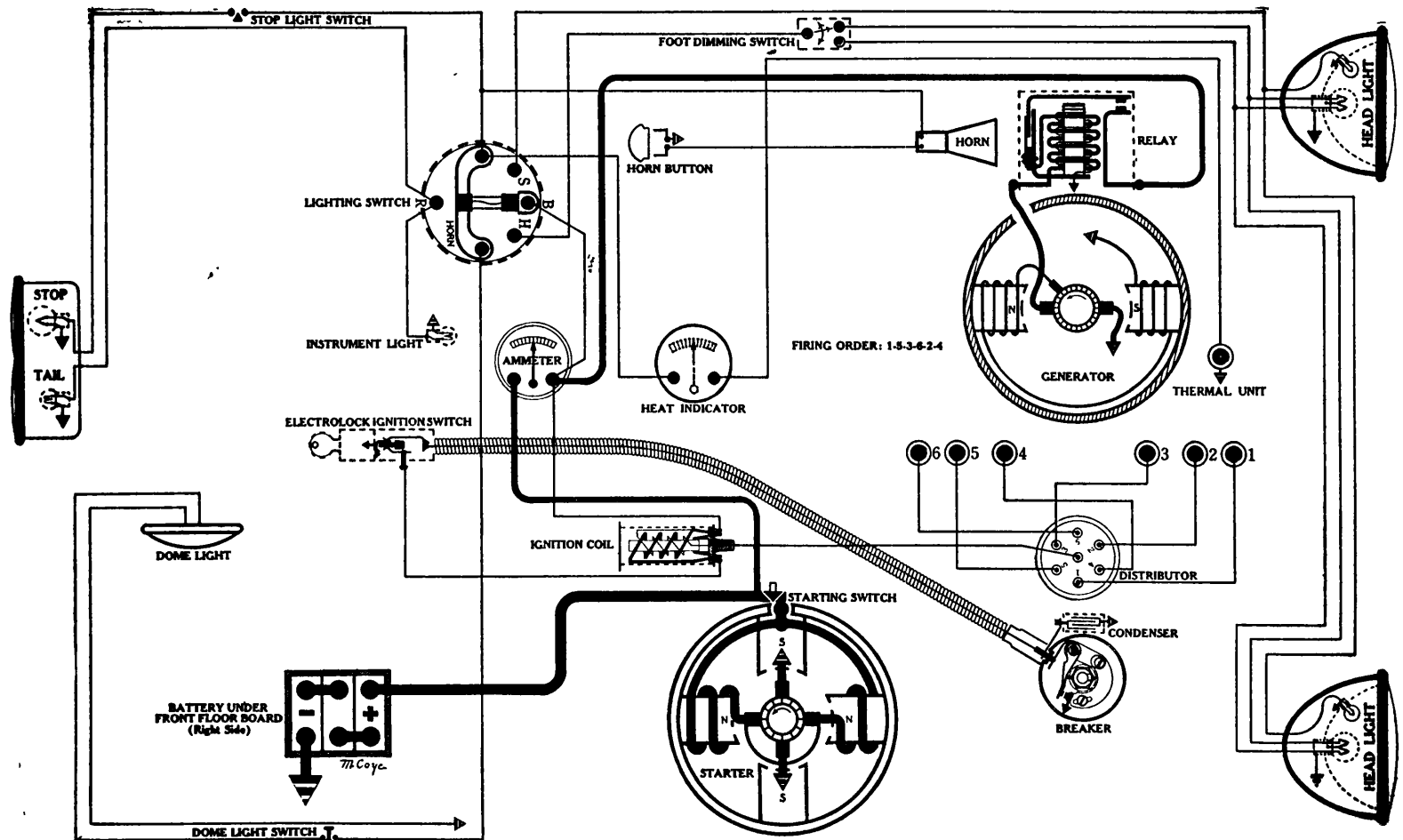
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. Fuse (with spare) on Junction Block, under hood left side.

Lamps—See P. 3, Sec. AA. **HEAD**—1110 (Bifocal); **SIDE**—63; **INSTRUMENT**—63; **DOME**—81; **STOP**—1129; **TAIL**—63; **CORNER**—81; **EMERGENCY**—1129.

CHEVROLET

Series AC, 6 cyl., (1929).

**BATTERY**

Exide, 3-VXB-13-1RD, 6 volts. Negative Terminal Grounded

Starting Capacity—98 amps. for 20 minutes.

Lighting Capacity—5 amps. for 18 hours.

Box—Length, 9½; width, 7⅞; height, 9 3/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-L

Connection to Engine—Bendix drive.

Running Free—65 amps. at 5 volts, 5000 R. P. M.

Cranking Engine—165-175 amps. at 4.3 volts.

Lock Torque—12 pound-feet, 475 amps., 3.63 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 827411 (on starter).

IGNITION

Rotation, R. H., Top View
Delco-Remy, 633-G

IMPORTANT NOTE: For instructions on changing points see P. 27, Sec. AA.

Breaker—Contact separation .018 to .022 inch.

Contact Spring Tension—17 to 22 oz.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—Regular Metric (AC type G); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—28 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0-2	300	0-1
1000	6-8	500	3-4
1500	12-14	750	6-7
2000	20-22	1000	10-11
2400	26-28	1200	13-14

Coil—Delco-Remy, 528-C.

Ignition Switch—Delco-Remy "Electrolock" 427-B. For details of operation and instructions on servicing see P. 17, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 943-J

Performance Data—Gen. cold (no thermostat).

Amps.	R.P.M.	V lts
0	575	6.5
5	850	7.1
12	1250	7.8
16	1650	8.
18	1850 (Max.)	8.2

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—4½ to 5¼ amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-H

Closes—7-7½ volts.

Opens—0-2½ amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-C.

Fuses—Single 20 amps. fus. mounted on switch back.

Foot Dimming Switch—Delco-Remy, 465-H.

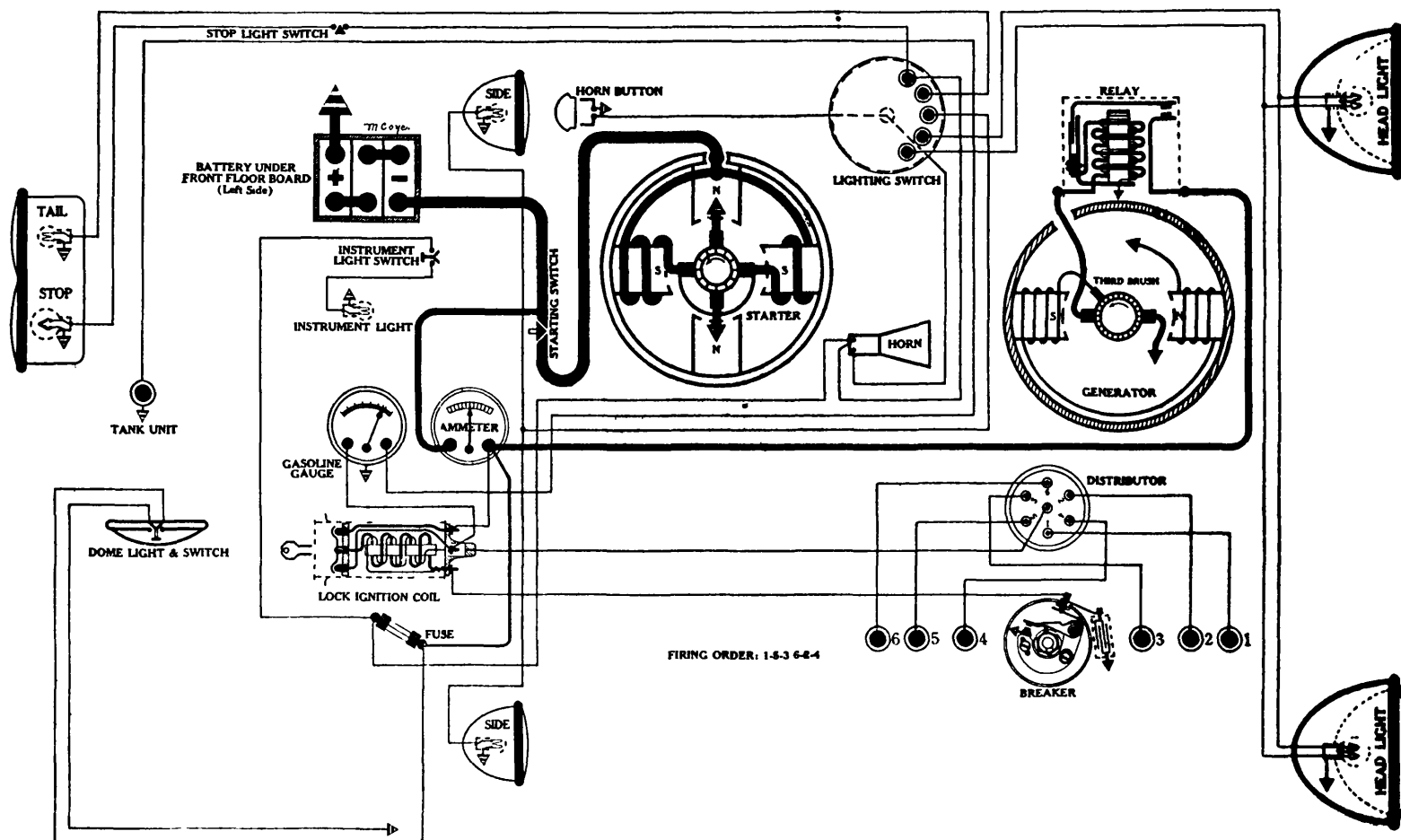
Location—On to board (left side). Tilt beam controlled by pressing plunger by foot.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; STOP—87; TAIL—63; INSTRUMENT—63.

CHRYSLER

Model 65, (1929)

For wiring of early 1929 Chrysler 65 cars, equipped with Shaler Ignition Switch refer to 1929 D Soto (Delco-Remy system). Lock Ignition Coil standard equipment after April 1, 1929.



BATTERY

Willard, WSB-15, 6 volts. Positive Terminal Grounded

Starting Capacity—114 amps. for 20 minutes.

Lighting Capacity—5 amps. for 20 hours.

Box—Length, 10 5/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 714-D

Connection to Engine—Bendix drive.

Running Free—65 amps. at 5 volts, 5000 R. P. M.

Cranking Engine—175-180 amps at 4.5 volts.

Lock Torque—12 pound-feet, 475 amps., 3.6 volts.

Brush Spring Tension—24-28 oz. on each.

Starting Switch—Remy, 404-T.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 639-X

Breaker—Contact separation .021 inch.

Contact Spring Tension—15-20 oz.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—"Silver Dome" motor—7/8" regular (AC type

A); Gap .027 inch. "Red Head" motor—7/8" semi

aircraft (AC type Y); Gap .027 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	0-2	200	0-1
800	4-6	400	2-3
1200	8-10	600	4-5
1800	12-14	900	6-7
2600	18-20	1300	9-10

Coil—Delco-Remy, 528-V.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine. Coil has three "primary"

terminals marked "Bat", "Gauge", and "Timer". Coil must be connected as marked

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 943-H

Performance Data—Gen. cold. (No thermostat used).

Amps	R.P.M.	Volts
0	680	6.5
3	875	7
8	1175	7.5
14	1550	8
18	1700 (Max.)	8.2

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—16-18 amps. at 6 volts.

Field Test—4 1/2 to 5 amps. at 6 volts, across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-H

Closes—7-7 1/2 volts

Opens—0-2 1/2 amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Clum, 10738.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

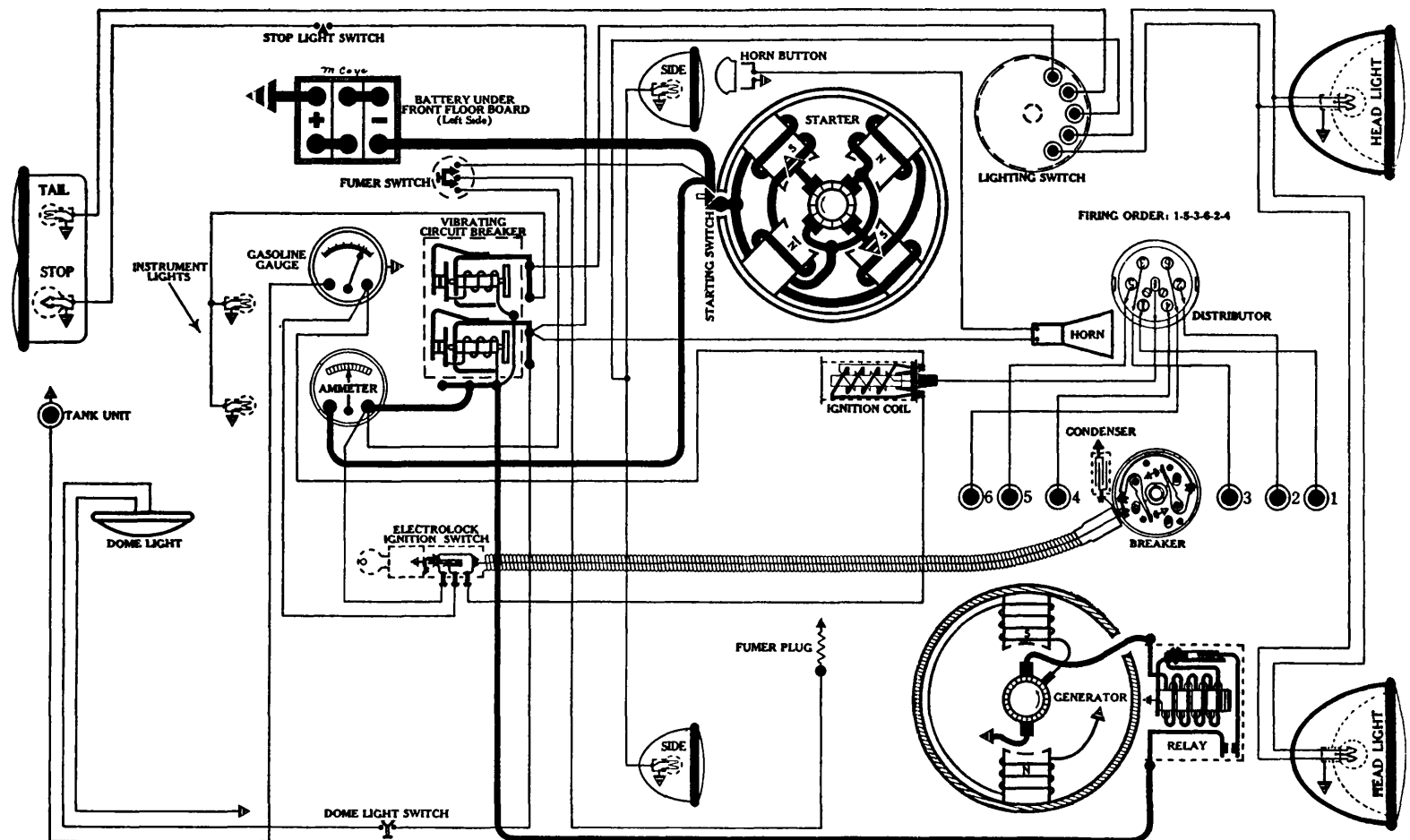
Fuses—Single 20 amp. fuse mounted behind instrument board.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; (If two socket Tail Light)—STOP—87; TAIL—63; (If single socket Tail Light)—STOP AND TAIL—1158.

NOTE: This is the old style Ford head light bulb with two filaments; make sure the 3 C P filament burns for tail light.

CHRYSLER

Model 75, (1929)



BATTERY

Willard, WSB-17, 6 volts. Positive Terminal Grounded
Starting Capacity—130 amps. for 20 minutes.
Lighting Capacity—5 amps. for 23 hours.
Box—Length, 11 11/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 728-B

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on starter. This is a gear reduction job, a pinion being cut on the armature shaft.

Running Free—70 amps. at 5 volts, 2500 R. P. M.

Cranking Engine—150-160 amps. at 4.4 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Mounted on starter.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 659-B

Breakers—Contact separation .022 inch.

Contact Spring Tension—17-21 oz. on each.

Timing—Remove 1/8 inch pipe plug from head above No. 6 cylinder, and place gauge rod thru hole and in contact with piston head. Hand crank engine until No. 6 piston is coming up on exhaust stroke. Stop when .035 inch before T. D. C. (stop at T. D. C. for "Red Head"), set ignition. See instructions, P. 1, Sec. AA.

Spark Plugs—"Silver Dome" motor—7/8" regular (AC type A); Gap .027 inch. "Red Head" motor—7/8" semi-aircraft (AC type Y); Gap .027 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—25 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	0-1	200	0-5
800	6-8	400	3-4
1500	12-14	750	6-7
2500	16-18	1250	8-9
3000	20-22	1500	10-11

Coil—Delco-Remy, 525-E.

Ignition Switch—"Electrolock", type B. For theory of operation and instructions on servicing, see P. 18, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-F

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts
0	575	6.5
3	700	7.
6	800	7.1
11	1000	7.9
15	1200	8.1
20	1450 (Max.)	8.3
19	1700	8.3

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Field Test—4.75-5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7 1/2 volts.

Opens—0-2 1/2 amps. discharge.

Contact Gap—.015-.025 inch.

Cor Gap—.014-.018 inch, contacts closed.

LIGHTING

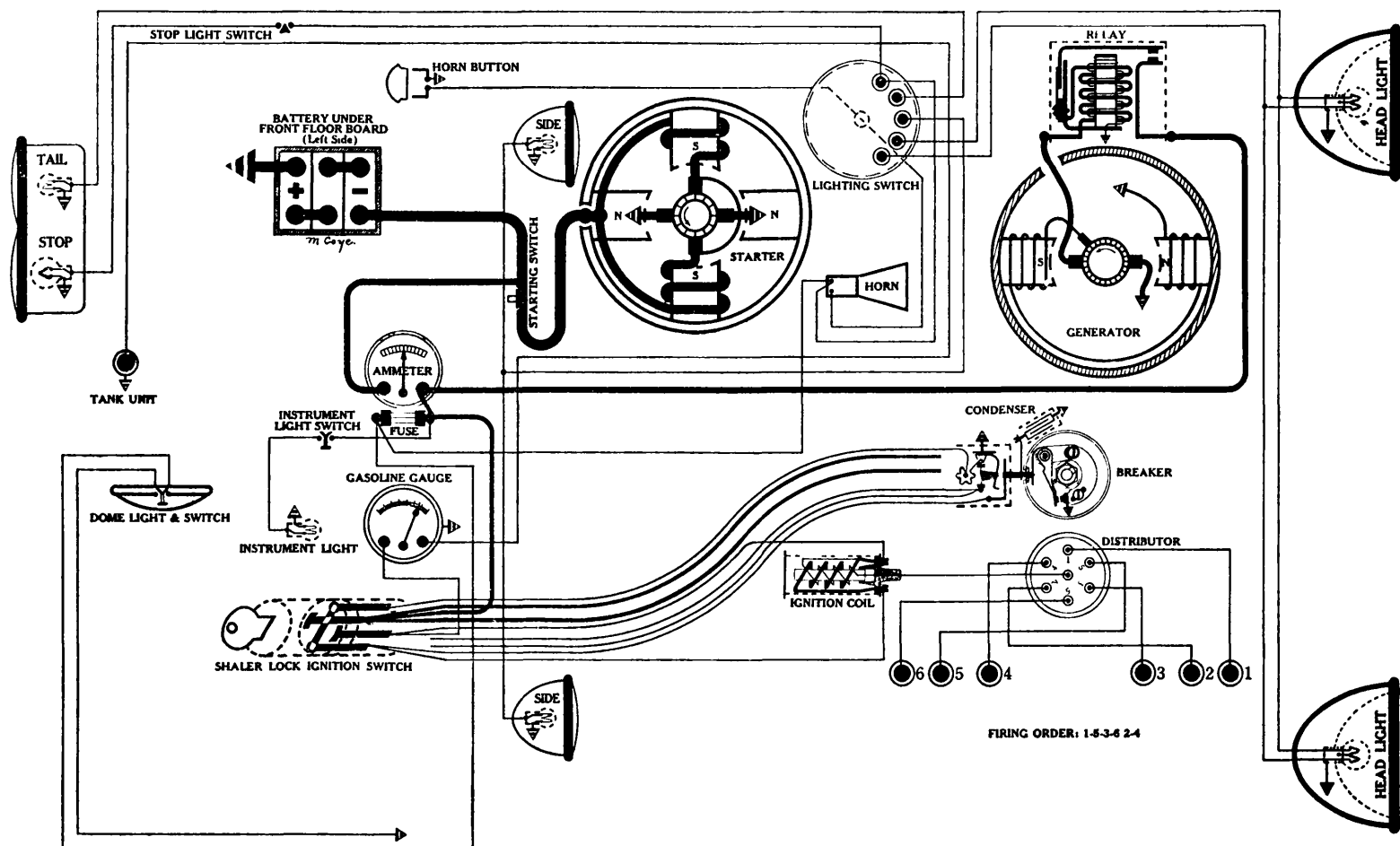
Switch—Clum No. 10738.

Vibrating Circuit Breakers—Start 25-30 amps. Operate 10-15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

DE SOTO

Model, Early 1929 (Delco-Remy System)



BATTERY

Willard, WSB-13, 6 volts. Positive Terminal Grounded
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17 hours.
Box—Length, 9 1/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-J

Connection to Engine—Bendix drive.
Running Free—65 amps. at 5 volts, 5000 R. P. M.
Cranking Engine—175-180 amps. at 4.5 volts.
Lock Torque—12 pound-feet, 475 amps., 3.6 volts.
Brush Spring Tension—24-28 oz. on each.
Starting Switch—Delco-Remy, 404-Y.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 631-C

Breaker—Contact separation .022 inch.
Contact Spring Tension—17 to 21 oz.
Timing—See detailed instructions P. 1, Sec. AA.
1—Locate T. D. C. 2—Locate rotor. 3—Set spark.
Spark Plugs—High Compression Engine—Semi-metric "Air-
craft" (AC type N-1); Gap .027 inch. Low Com-
pression Engine—Regular metric (AC type G); Gap .027
inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng R P M.	Degrees Advance (on flywheel)	Dist R P M	Degrees Advance (on cam)
400	0-2	200	0-1
800	4-6	400	2-3
1200	8-10	600	4-5
1800	12-14	900	6-7
2600	18-20	1300	9-10

Coil—Delco-Remy, 525-E.

Ignition Switch—Shaler Lock Switch. For details of opera-
tion and instructions on servicing see P. 23, Sec. AA

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 943-H

Performance Data—Gen. cold. (No thermostat used).

Amps	R P M	Volts
0	680	6.5
3	875	7
8	1175	7.5
14	1550	8
18	1700 (Max)	8.2

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—16-18 amps. at 6 volts.

Field Test—4 1/2 to 5 amps at 6 volts, across field coils in
series.

Brush Spring Tension—16 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22,
P. 7, Sec. AA.

RELAY

Delco-Remy, 265-H

Closes—7-7 1/2 volts.

Opens—0-2 1/2 amps. discharge

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Clum, 10738.

Location—Foot of steering column. Lights controlled by
lever on steering wheel.

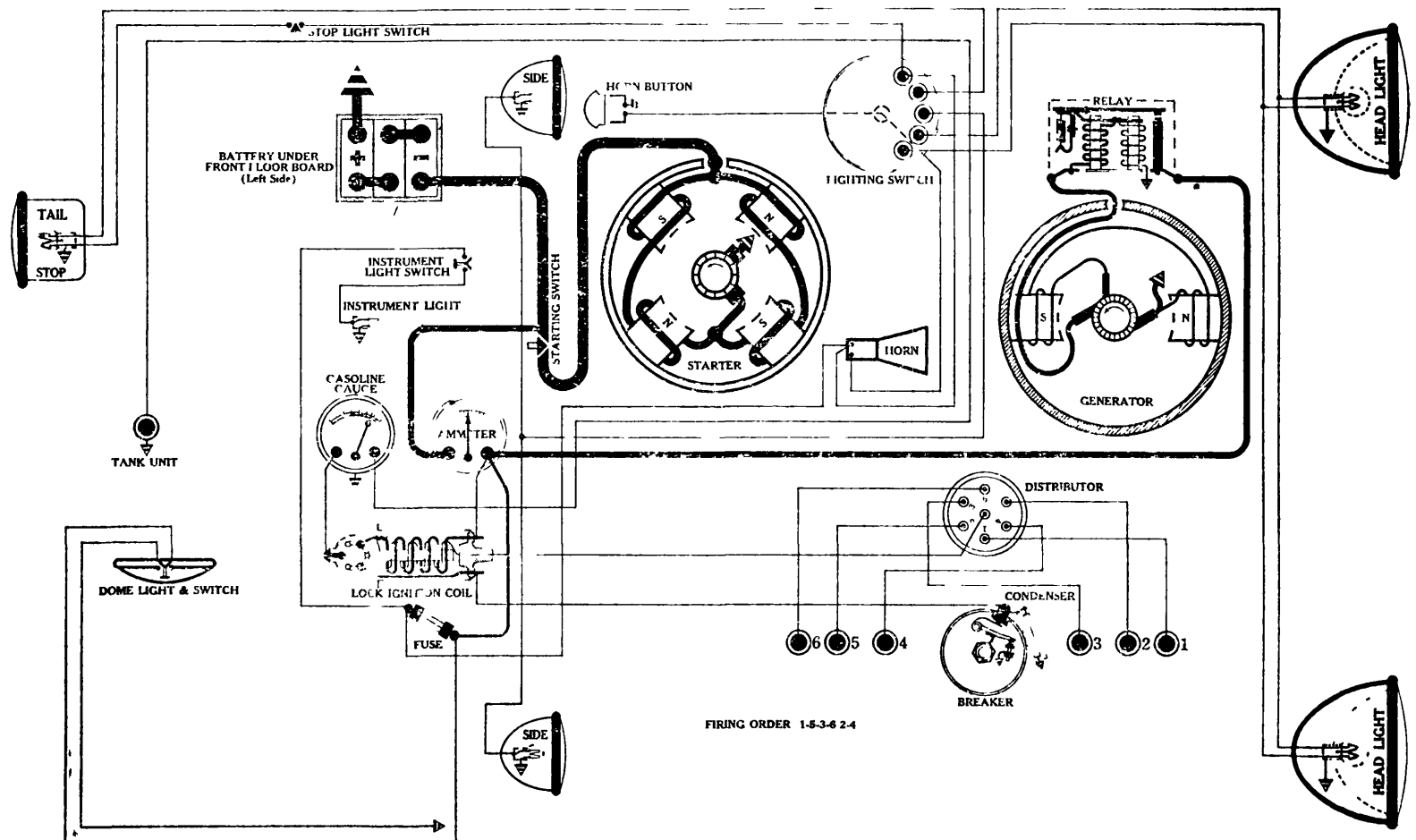
Fuses—Single 20 amp. fuse mounted behind instrument
board.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE
—63. INSTRUMENT—63; DOME—63; (If two
socket Tail Light)—STOP—87; TAIL—63; (If single
socket Tail Light)—STOP AND TAIL—1158

NOTE This is the old style Ford head light bulb with two filaments, make sure
the 3 C P filament burns for tail light.

DE SOTO

Model, Lat 1929 (North East System)
(After Feb. 1st, 1929).



BATTERY

Willard, WSB-13, 6 volts. Positive Terminal Grounded
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17 hours.
Box—Length, 9 1/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
North East, Model SBH, Type 6534

Connection to Engine—Bendix drive.
Running Free—60 amps. at 5 volts.
Cranking Engine—150-160 amps. at 4.7 volts.
Lock Torque—13 1/2 pound-feet, 550 amps. at 3.2 volts.
Brush Spring Tension—20-22 oz. on each.
Starting Switch—North East, type 22050.

IGNITION

Rotation, R. H., Top View
North East, Model TBU, Type 10849

Breaker—Contact separation .020 inch.
Contact Spring Tension—18-22 oz.
Timing—See detailed instructions P. 1, Sec. AA.
1—Locate T. D. C. 2—Locate rotor. 3—Set spark.
Spark Plugs—High Compression Engine—Semi-metric "Air-craft" (AC type N-1); Gap—.027 inch. Low Compression Engine—Regular metric (AC type G); Gap—.027 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—18 degrees (on Flywheel)

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
600	0-2	300	0-1
800	4	400	2
1200	8	600	4
1800	14	900	7
2540	18	1270	9

Coil—North East Lock Coil, type 21998.

Ignition Switch—Integral with coil.

GENERATOR

Rotation, L. H., Com. End
North East, Model LAB, Type 6530

Performance Data—Gen. cold.

Amps	RPM	Volts	Amps	RPM	Volts
0	750	6.5	15	1400	8
5 1/2	1000	7.2	18 1/2	1800	8.2
11	1200	7.9	19	2000 (Max)	8.3

Motoring Freely—4 to 5 amps. at 6 volts.

Max. Stall Current—21 to 23 amps. at 6 volts.

Field Test—3 amps. at 6 volts, across field coils in series.

Brush Spring Tension—12 to 16 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

North East, Type 20220

Closes—7 to 7 1/2 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.020 to .025 inch.

Core Gap—.015 inch.

LIGHTING

Switch—Clum, 10738.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

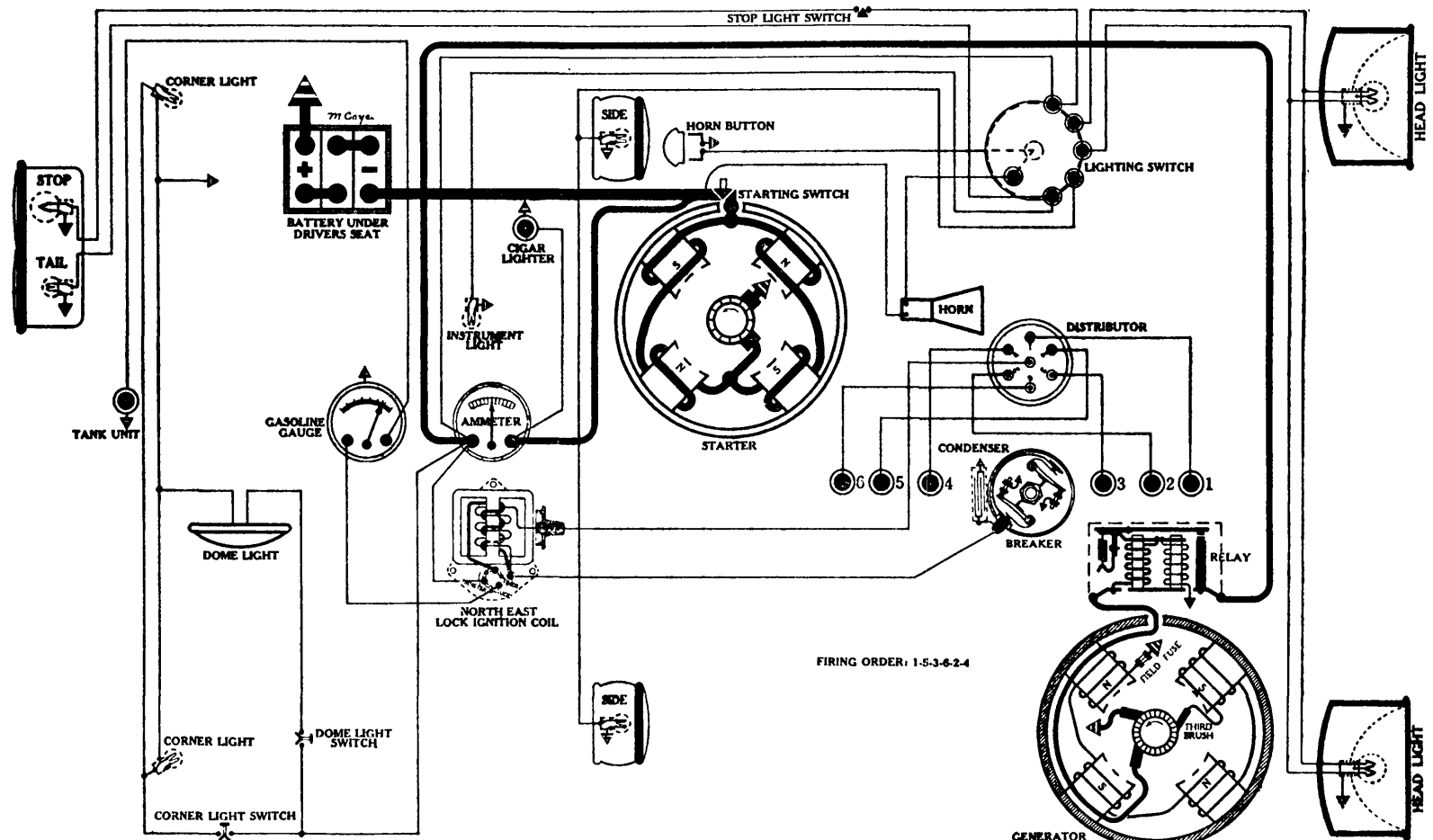
Fuses—Single 20 amp. fuse mounted behind instrument board.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158, single socket.

NOTE: This is the old style Ford head light bulb with two filaments; make sure the 3 C P filament burns for tail light.

DODGE

Model, Senior Six, (1929)



BATTERY

Willard, WSB-17, 6 volts. Positive Terminal Grounded
 Starting Capacity—130 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 23 hours.
 Box—Length, 11 11/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
 North East, Model SBH, Type 6400

Connection to Engine—Bendix drive.
 Running Free—85 amps. at 6 volts.
 Cranking Engine—140-160 amps. at 4.8 volts.
 Lock Torque—16 pound-feet, 550 amps., 3.1 volts.
 Brush Spring Tension—28-32 oz. on each.
 Starting Switch—North East, Type 15380.

IGNITION

Rotation, R. H., Top View
 North East, Model TBU, Type 10846-A

Breakers—Contact separation .020 inch.
 Contact Spring Tension—18-22 oz. on each.
 Timing—See detailed instructions P. 1, Sec. A.A.
 1—Locate T. D. C. 2—Locate rotor. 3—Set spark.
 Spark Plugs—7/8" regular (AC type A); Gap—.025 inch.
 Firing Order—1-5-3-6-2-4.
 Manual Advance—20 degrees (on Flywheel).
 Automatic Advance—15 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0-2	300	0-1
1000	4	500	2
1670	10	835	5
1800	12	900	6
2200	15	1100	7 1/2

Coil—North East Lock Coil, typ SS-19232.
 Ignition Switch—Integral with coil.

GENERATOR

Rotation, L. H., Com. End
 North East, Model LB, Type 6390-A

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0	425	6.5
5	600	7.
8	800	7.3
15	1000	8.1
17	1200	8.2
17.5	1400	8.2

Motoring Freely—5 1/2 amps. at 6 volts.
 Max. Stall Current—18 amps. at 6 volts.
 Field Test—7 amps. at 6 volts across field coils in series.
 Field Fuse—6 amps. mounted in Generator end frame, and held by slotted brass cap in housing.
 Brush Spring Tension—18 oz. on each.
 Third Brush Adjustment—Not necessary to loosen cover band. See Fig. 26, P. 7, Sec. A.A.

NOTE: Third brush cannot be moved without changing position of main brushes. Entire brush rig made in one piece, and moves as a unit.

RELAY

North East, Type 20220

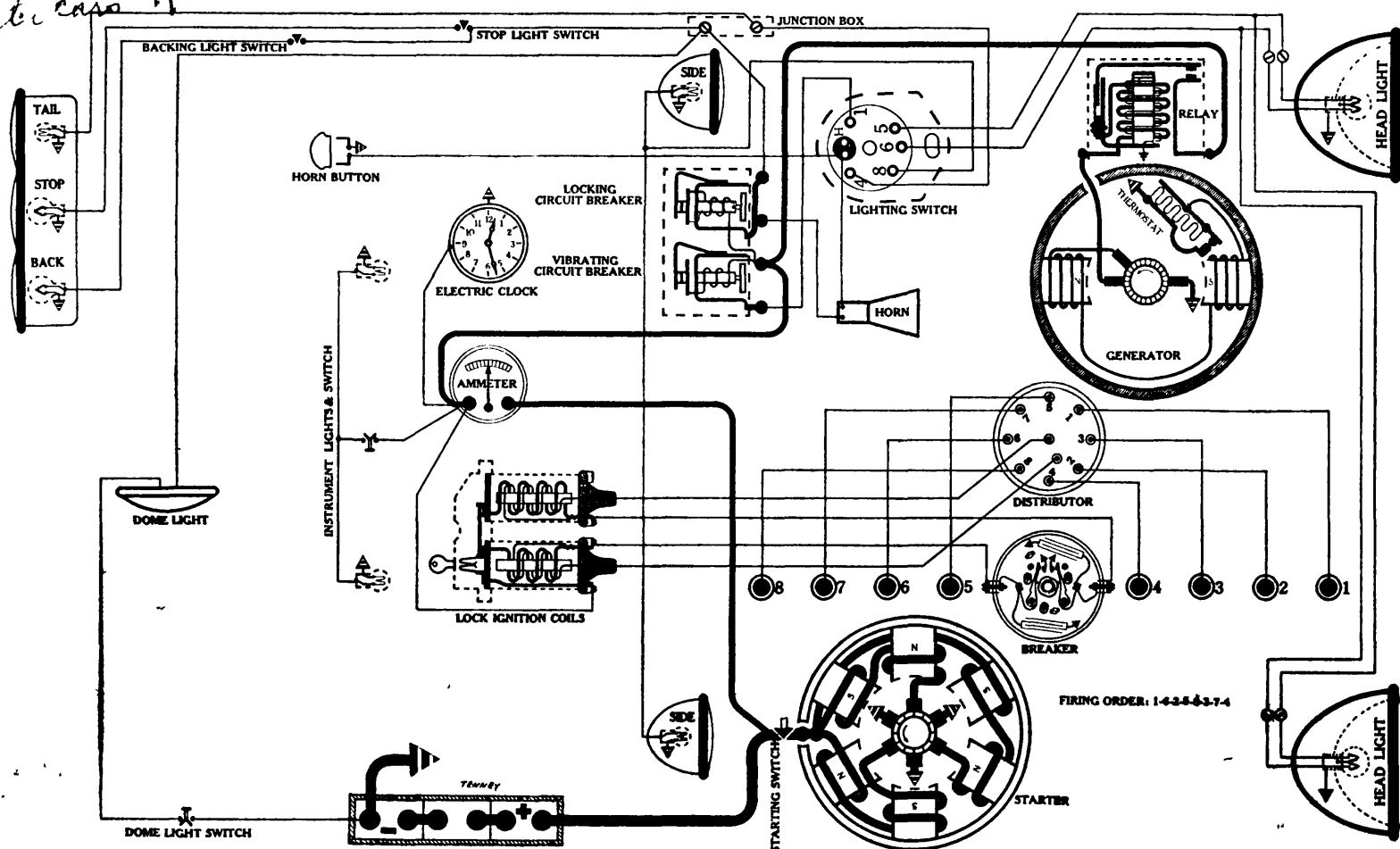
Closes—7 to 7 1/2 volts.
 Opens—0 to 2 amps. discharge.
 Contact Gap—.020 to .025 inch.
 Core Gap—.015 inch.

LIGHTING

Switch—Briggs & Stratton, 40909.
 Location—Foot of steering column. Lights controlled by lever on steering wheel.
 Fuses—None.
 Lamps—See P. 3, Sec. A.A. HEAD—1110 (Bifocal); SIDE—63; DOME—81; CORNER—63; INSTRUMENT—63; STOP—87; TAIL—63.

DUESENBERG

Model, Straight Eight, (1929)
Model J, Straight Eight, (1929-33).



BATTERY

Exide, 3-XCRV-21-2G, 6 volts. Negative Terminal Grounded

Starting Capacity—164 amps. for 20 minutes.

Lighting Capacity—5 amps. for 30 hours.

Box—Length, 20 7/16; width, 5 1/2; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 429

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—70 amps. at 5 volts, 3000 R. P. M.

Cranking Engine—245-260 amps. at 4 volts.

Lock Torque—19 pound-feet, 500 amps. at 3 volts.

Brush Spring Tension—20-24 oz. on each.

Starting Switch—Mounted on starter motor.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 4044, 4094

IMPORTANT NOTE: This unit uses a four-lobe cam with two independent breaker arms. The two sets of breakers must be accurately located to operate at intervals of exactly 45 degrees of distributor shaft travel, corresponding to 90 degrees of flywheel. An eccentric adjusting screw is provided which moves one breaker assembly.

Breakers—Contact separation .018 to .024 inch.

Contact Spring Tension—17 to 21 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—Regular metric (AC type G); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—32 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng R P M	Degrees Advance (on flywheel)	Dist. R P M.	Degrees Advance (on cam)
800	0 2	400	0-1
1200	8	600	4
1600	14	800	7
2200	22	1100	11

Coils—Delco-Remy lock coils No. 553-A, B.

NOTE This unit is a combined ignition switch with coils. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 428

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts
0	450	6.5
6	600	7.1
11	800	7.9
16	1000	8.1
20	1200 (Max.)	8.4

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—3 1/2 amps. at 6 volts, across field coils in series.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig 13, P. 7, Sec. AA.

RELAY

Delco-Remy, 266-N

Closes—7 to 7 1/2 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-D.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

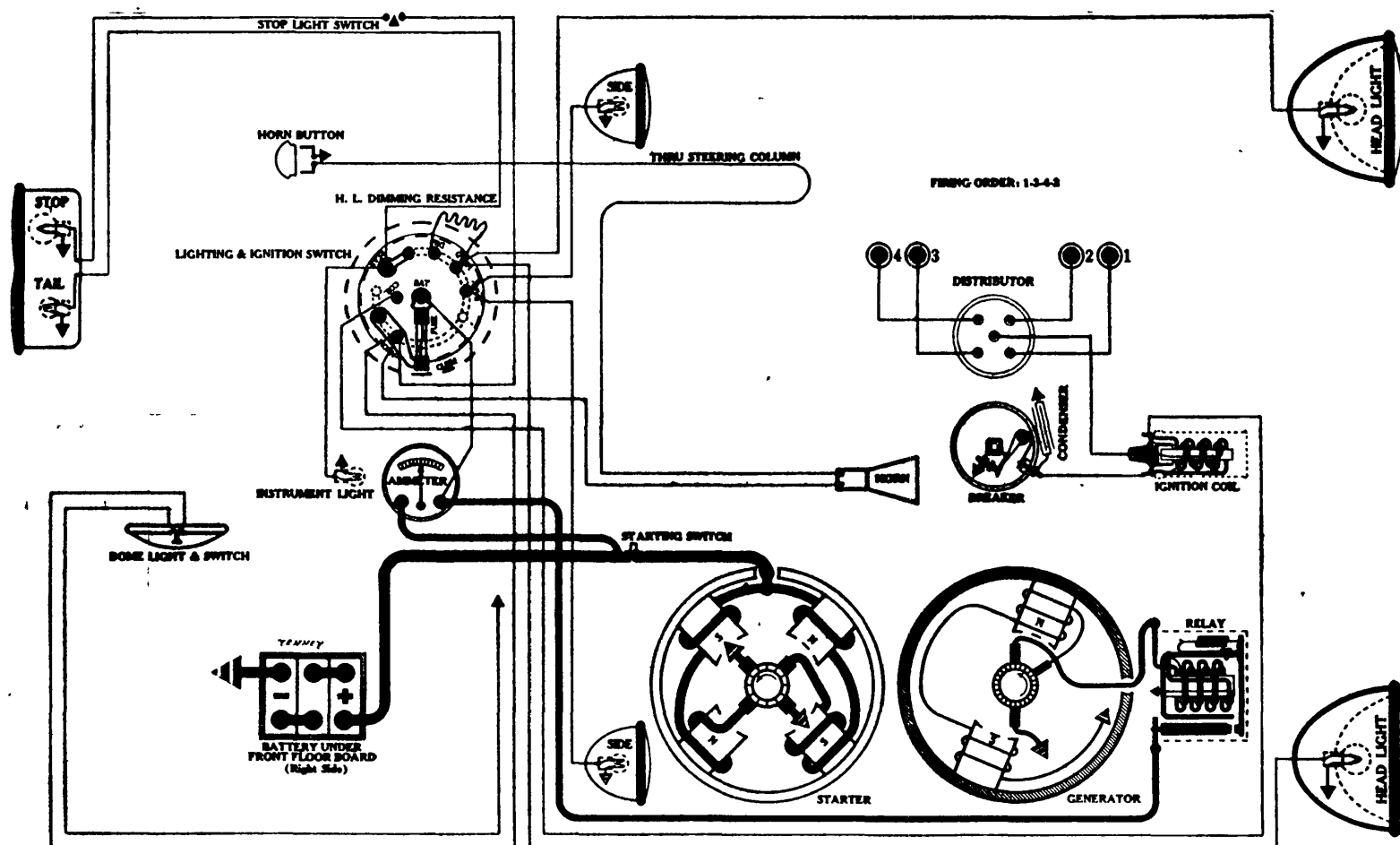
Circuit Breaker—Delco-Remy, 5759.

Vibrating—Starts 25-30 amps. Operates 10-15. Lock-Out—Starts 25-30 amps. Operates with discharge less than 1 ampere.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; STOP—1129; BACK—1129; TAIL—63.

DURANT

Model 40, (1929)



BATTERY

U. S. L., 3-CVX-5X-7, 6 volts. Negative Terminal Grounded
Starting Capacity—96 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17 hours.
Box—Length, 9 1/16; width, 7 1/4; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MZ-4012

Connection to Engine—Bendix drive.
Running Free—50 amps. at 5.5 volts.
Cranking Engine—160 amps. at 5.25 volts, 228 R. P. M.
Lock Torque—13.6 pound-feet, 540 amps., 3 volts.
Brush Spring Tension—20 to 24 oz. on each.
Starting Switch—Auto-Lite, SW-4001.

IGNITION

Rotation, R. H., Top View
 Auto-Lite Dist. IGB-4019-A

Breaker—Contact separation .020 to .024 inch.
Contact Spring Tension—18-20 oz.
Timing—See detailed instructions P. 1, Sec. AA.
 1—Locate T. D. C. 2—Locate rotor. 3—Set spark.
Spark Plugs—7/8" regular (AC type A); Gap .025 inch.
Firing Order—1-3-4-2.
Manual Advance—25 degrees (on Flywheel).
Automatic Advance—22 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywh 1)	Dist. R.P.M.	Degrees Advance (on cam)
600.....	0-2.....	300.....	0-1.....
1200.....	8.....	600.....	4.....
1800.....	16.....	900.....	8.....
2400.....	22.....	1200.....	12.....

Coil—Auto-Lit , IG-4066.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAL-4105

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	510.....	6.5.....
4.....	680.....	6.9.....
10.....	960.....	7.5.....
14.....	1450.....	8.2.....

Maximum Charging Rate—16 amps. at 8 volts, or 15 amps. at 7.5 volts.

Motoring Freely—4 3/4 amps. at 6 volts.

Max. Stall Current—18.5 amps. at 6 volts.

Field Test—4 1/2 amps. at 6.2 volts directly across field coils in series.

Field Fuse—None.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7-7.5 volts.

Opens—1/2-2 1/2 amps. discharge.

Contact Gap—.025-.035 inch.

Core Gap—.010-.030 inch, contacts closed.

LIGHTING

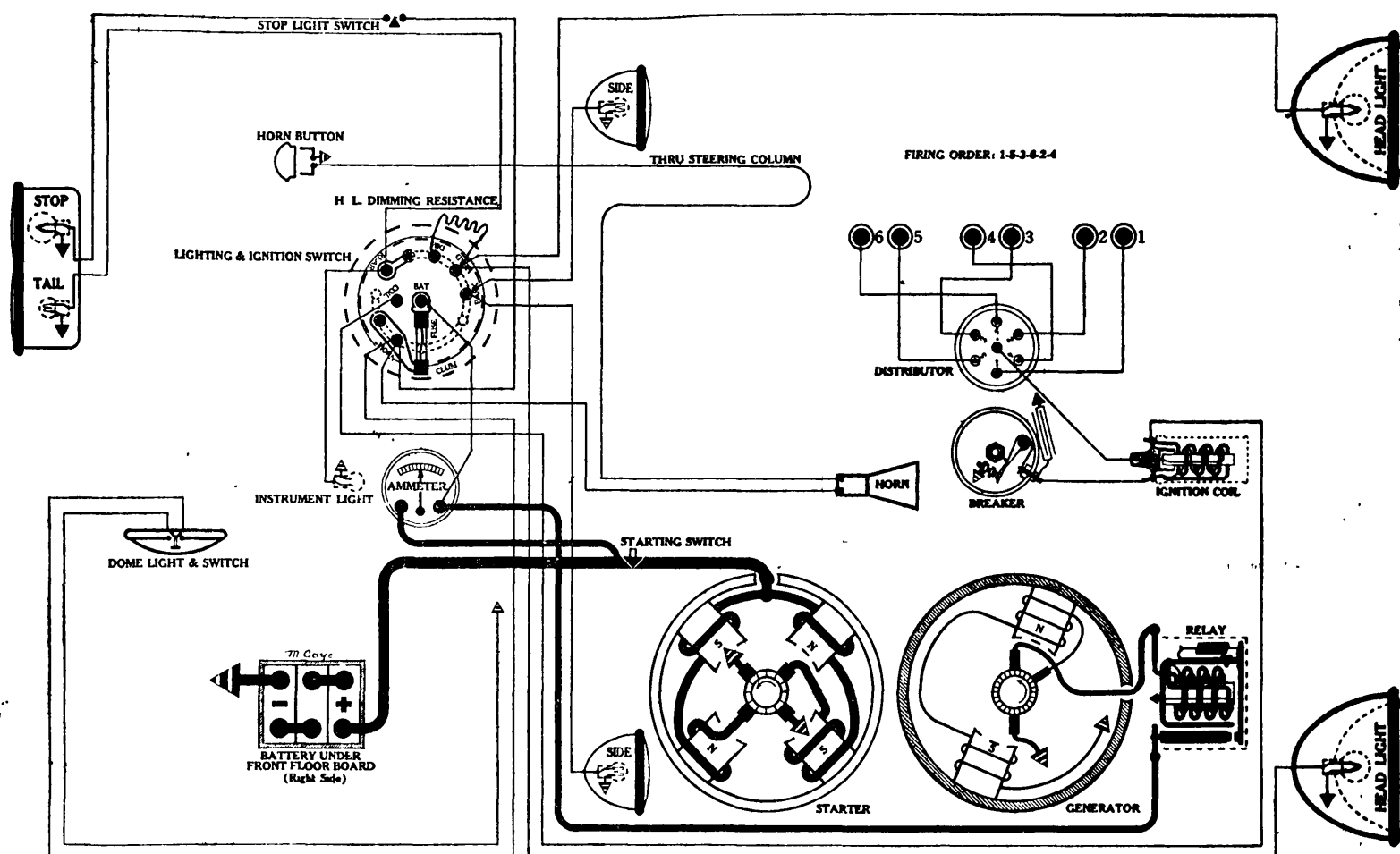
Switch—Clum 10628.

Fuses—Singl 20 amp. fuse mount d on switch back.

Lamps—Se P. 3, Sec. AA. HEAD—1129; INSTRUMENT—63; TAIL—63; DOME—63.

DURANT

Model D-60, (1929)



BATTERY

U. S. L., 3-CVX-5X-7, 6 volts. Negative terminal grounded.
Starting Capacity—96 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17 hours.
Box—Length, 9 1/16; width, 7 1/4; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MZ-4012

Connection to Engine—Bendix drive.
Running Free—50 amps. at 5.5 volts.
Cranking Engine—160 amps. at 5.25 volts, 228 R. P. M.
Lock Torque—13.6 pound-feet, 540 amps., 3 volts.
Brush Spring Tension—20 to 24 oz. on each.
Starting Switch—Auto-Lite, SW-4001.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGB-4001-B

Breaker—Contact separation .020 to .024 inch.
Contact Spring Tension—18-20 oz.
Timing—See detailed instructions P. 1, Sec. AA.
1—Locate T. D. C. 2—Locate rotor. 3—Set spark.
Spark Plugs—S.A.E. regular (AC type E); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Manual Advance—25 degrees (on Flywheel).
Automatic Advance—22 degrees (on Flywheel).

Eng. R.P.M.	Degree Advance (on flywheel)	Dist. R.P.M.	Degree Advance (on cam)
600	0-2	300	0-1
1200	8	600	4
1800	16	900	8
2400	22	1200	12

Coil—Auto-Lite, IG-4066.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4104, GAL-4107

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0	510	6.5
4	680	6.9
10	960	7.5
14	1450	8.2

Maximum Charging Rate—16 amps. at 8 volts, or 15 amps. at 7.5 volts.

Motoring Freely—4 3/4 amps. at 6 volts.

Max. Stall Current—18.5 amps. at 6 volts.

Field Test—4 1/2 amps. at 6.2 volts directly across field coils in series.

Field Fuse—None.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7.5 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

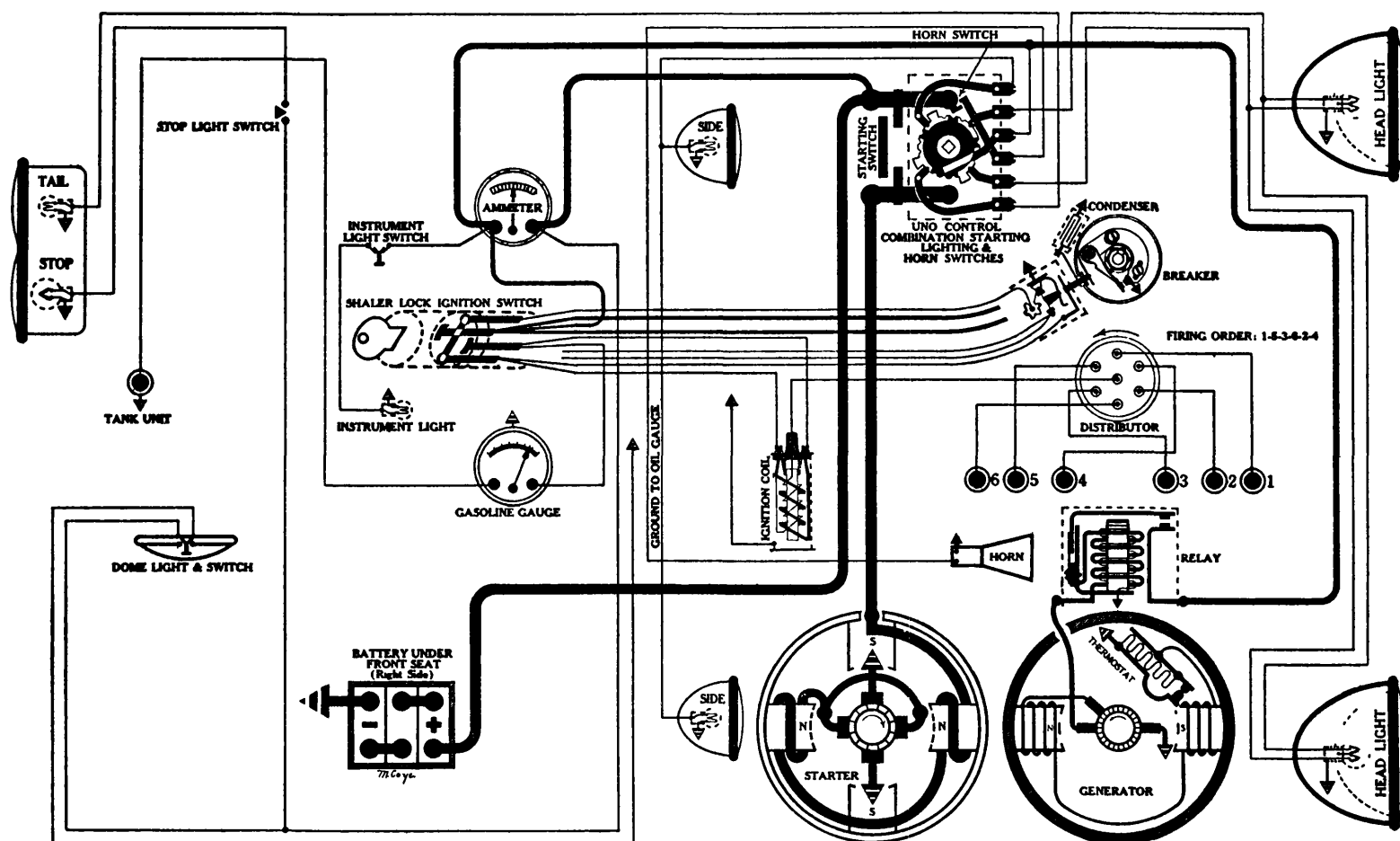
Switch—Clum, 10628.

Fuses—Single 20 amp. fuse mount d n switch back.

Lamps—See P. 3, Sec. AA. HEAD—1129; INSTRUMENT—63; TAIL—63; DOME—63.

ELCAR

Model 6-75 (1929-31)



BATTERY

U. S. L., XY-13-X, 6 volts. Negative terminal grounded
 Starting Capacity—102 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 17½ hours.
 Box—Length, 9 1/16; width, 7¼; height, 9¼ inches.

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 716-A

Connection to Engine—Bendix drive.

NOTE Gear reduction job A 14 T. pinion cut on armature shaft drives 22 T. pinion on Bendix shaft

Running Free—50 amps. at 5 volts, 4000 R. P. M.

Cranking Engine—175-180 amps. at 4.5 volts.

Lock Torque—14 pound-feet, 350 amps., 3.2 volts.

Brush Spring Tension—24-26 oz. on each.

Starting Switch—Located foot of steering column Operated by pulling up on horn button.

IGNITION

Rotation, L. H., Top View
 Delco-Remy, 631-D, E

Breaker—Contact separation .024 inch.

Contact Spring Tension—18-20 oz.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C 2—Locate rotor. 3—Set spark

Spark Plugs—7/8" regular (AC type A); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—30 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400 -	0 -	200 -	0
800 -	5 -	400 -	2 5
1200 -	10 -	600 -	5
1600 -	15 -	800 -	7 5
2000 -	22 -	1100 -	11
2400 -	25 -	1200 -	12
2800 -	30 -	1400 -	15

Coil—Delco-Remy, 528-C.

Ignition Switch—Shaler Lock Switch. For details of operation and instructions on servicing see P. 23, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 955-H

Performance Data—Gen. cold.		Thermostat clos d.	
Amps	R P M.		Volts
0	575	- -	6 5
3	700	- -	7
6	800	- -	7 1
11	1000	- -	7 9
15	1200	- -	8 1
20	1450 (Max.)	- -	8 3
19	1700	- -	8 3

NOTE Thermostat opens about 165° F, reducing charging rate approx. 30-40%

Motoring Freely—5-5½ amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4¾ to 5½ amps. at 6 volts across field coils in series.

Brush Spring Tension—16-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7½ volts.

Opens—0-2½ amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton, 40941.

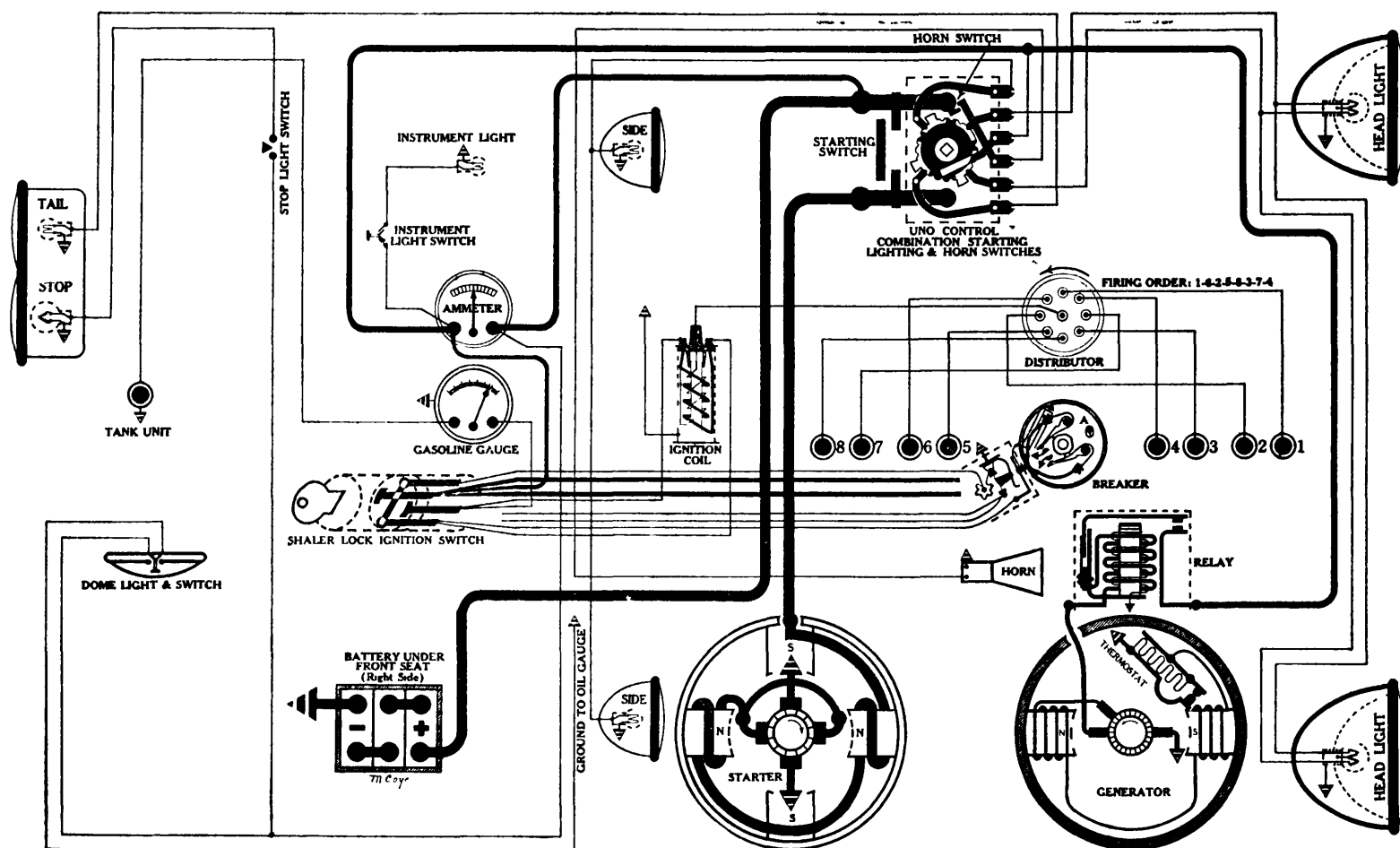
Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all being controlled by horn button on steering wheel. For details of construction, and instructions on servicing, see P. 28, Sec. AA.

Fuses—None.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

ELCAR

Models 8-95 and 8-96 (1929-31)

**BATTERY**

U. S. L., 3-CVX-6X, 6 volts. Negative Terminal Grounded
Starting Capacity—115 amps. for 20 minutes.
Lighting Capacity—5 amps. for 21 hours.
Box—Length, 10 7/16; width, 7 7/16; height, 9 1/4 inches

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 716-A

Connection to Engine—Bendix drive.

NOTE Gear reduction job A 14 T. pinion cut on armature shaft drives 22 T. pinion on Bendix shift

Running Free—50 amps. at 5 volts, 4000 R. P. M.

Cranking Engine—175-180 amps. at 4.5 volts

Lock Torque—14 pound-feet, 350 amps., 3.2 volts.

Brush Spring Tension—24-26 oz. on each.

Starting Switch—Located foot of steering column. Operated by pulling up on horn button.

IGNITION

Rotation, L. H., Top View
 Delco-Remy, 651-B, C

IMPORTANT NOTE This unit uses a four-lobe cam with two breaker arms connected in parallel. Cam is so designed that one point is open when other is just breaking but closes few degrees after break occurs. The arms must be accurately synchronized to operate at intervals of exactly 45 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw "A" is provided, which moves one breaker assembly. Adjust by using Delco Remy synchronizing tool No. 820738 or rotary spark gap on test bench. See detailed instructions P. 13, Sec. AA.

Breakers—Contact separation .022 inch.

Contact Spring Tension—15-20 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—7/8" regular (AC type A); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—15 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
300	0 0	150	0 0
1000	2 5 6 5	500	1-3
1800	13 17	900	6 5-8.5

Coil—Delco-Remy, 528-C.

Ignition Switch—Shaler Lock Switch. For details of operation and instructions on servicing see P. 23, Sec. AA

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 955-H

Performance Data—Gen. cold. Thermostat closed.

Amps	RPM	Volts	Amps	RPM	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max)	8.3
6	860	7.1	19	1700	8.3
11	1000	7.2			

NOTE Thermostat opens about 165° F., reducing charging rate approx 30-40%

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps at 6 volts.

Field Test—4 3/4 to 5 1/2 amps at 6 volts across field coils in series.

Brush Spring Tension—16-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7 1/2 volts.

Opens—0-2 1/2 amps. discharge

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed

LIGHTING

Switch—Briggs & Stratton, 40941.

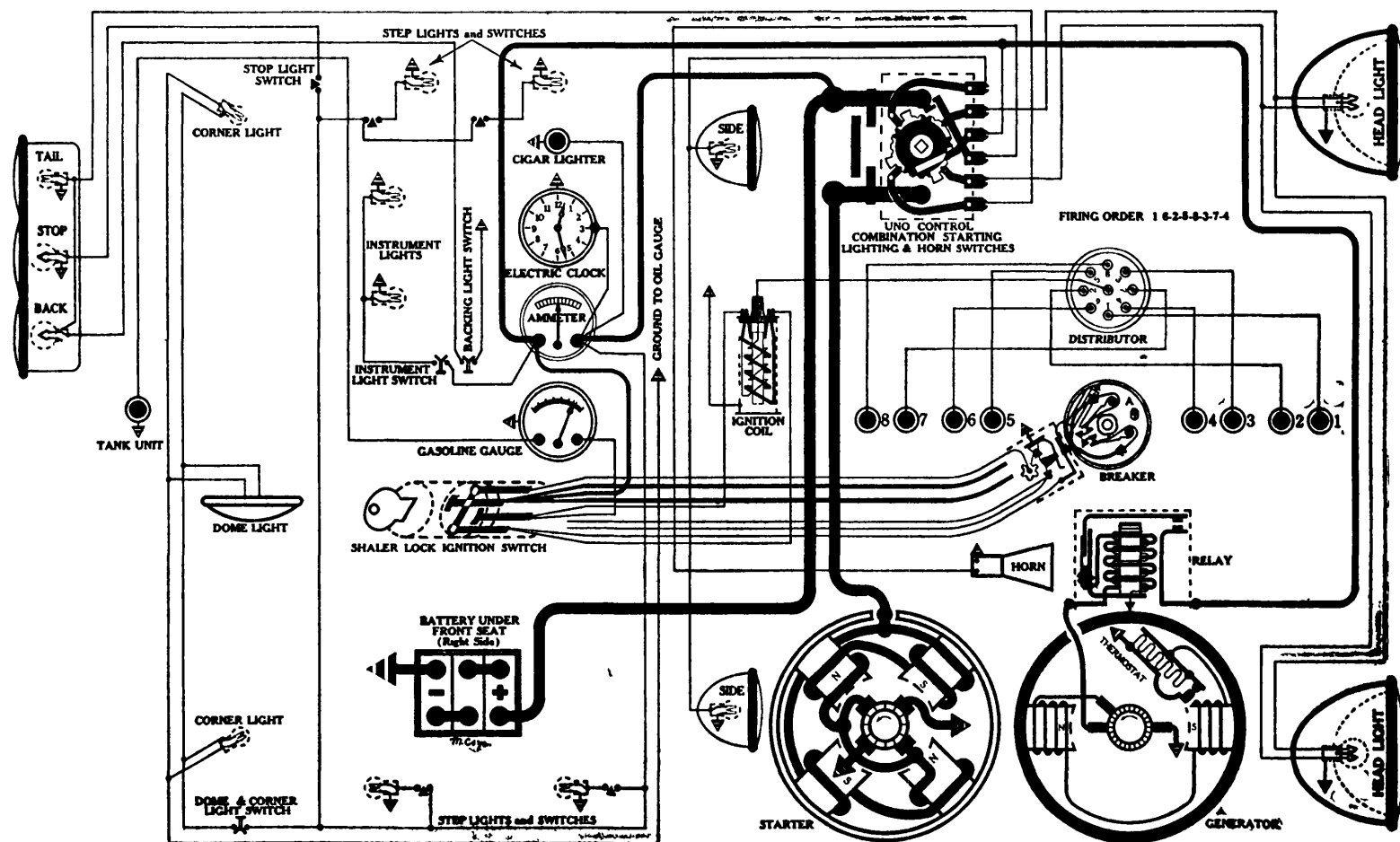
Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all being controlled by horn button on steering wheel. For details of construction, and instructions on servicing, see P. 28, Sec. AA.

Fuses—Non.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

ELCAR

Model 120, (1929); Models 130 and 140, (1930)

**BATTERY**

U. S. L., 3-HVX-6X-6, 6 volts. Negative Terminal Grounded

Starting Capacity—127 amps. for 20 minutes.

Lighting Capacity—5 amps. for 23½ hours.

Box—Length, 10 7/16; width, 7; height, 9¾ inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 720-Y

Connection to Engine—Bendix drive.

Running Free—65 amps. at 5 volts, 6000 R. P. M.

Cranking Engine—185-190 amps. at 4.1 volts.

Lock Torque—15 pound-feet, 570 amps., 3.1 volts.

Brush Spring Tension—24-28 oz. on each.

Starting Switch—Located foot of steering column. Operated by pulling up on horn button.

IGNITION

Rotation, R. H., Top View
Delco-Remy, SM-1032

IMPORTANT NOTE This unit uses a four-lobe cam with two breaker arms connected in parallel. Cam is so designed that one point is open when other is just breaking but closes few degrees after break occurs. The arms must be accurately synchronized to operate at intervals of exactly 45 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw "A" is provided which moves one breaker assembly. Adjust by using Delco-Remy synchronizing tool No. 820788 or rotary spark gap on test bench. See detailed instructions P. 13, Sec. AA.

Breakers—Contact separation .022 inch.

Contact Spring Tension—15-20 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark

Spark Plugs—7/8" regular (AC type A); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—25 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist. RPM	Degrees Advance (on cam)
500	0 2 5	250	0-1 25
1000	5 10	500	2 5-5
2000	16 5 21 5	1000	8 25-10 25
2600	21 5-26 5	1300	10 75-13.25

Coil—Delco-Remy, 528-C.

Ignition Switch—Shaler Lock Switch. For details of operation and instructions on servicing, see P. 23, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-K

Performance Data—Gen. cold. Thermostat closed.

Amps	RPM	Volts	Amps	RPM	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE Thermostat opens about 165° F., reducing charging rate approx. 30-40%

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4¾ to 5½ amps. at 6 volts across field coils in series.

Brush Spring Tension—16-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton, 40941.

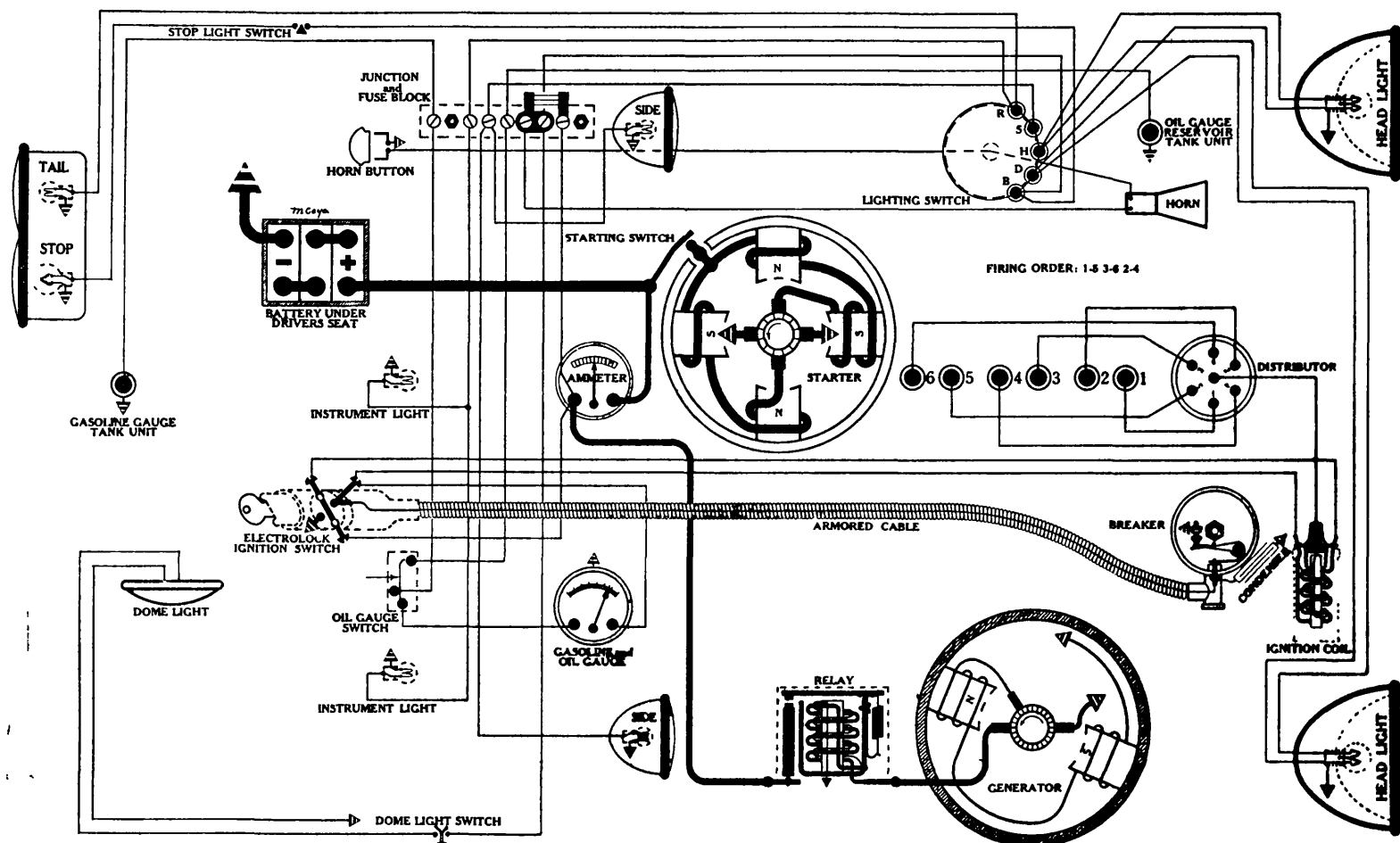
Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all being controlled by horn button on steering wheel. For details of construction, and instructions on servicing, see P. 28, Sec. AA.

Fuses—None.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; STEP—63; CORNER—63; DOME—63; STOP—87; BACK—87; TAIL—63.

ESSEX

Model, Super-Six Challenger, (1929)



BATTERY

Exide, 3-VXA-13-1, 6 volts. Negative Terminal Grounded
 Starting Capacity—98 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 16½ hours.
 Box—Length, 9; width, 7 5/32; height, 9 3/16 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MZ-4014

Connection to Engine—Bendix drive.
 Running Free—70 amps. at 6 volts.
 Cranking Engine—160-170 amps. at 4.5 volts.
 Lock Torque—12 pound-feet, 525 amps., 3.75 volts.
 Brush Spring Tension—24-28 oz. on each.
 Starting Switch—Mounted on starter. Operated by pull cable from instrument board.

IGNITION

Rotation, R. H., Top View
 Auto-Lite, Dist. IGB-4022

Breaker—Contact separation .020 to .024 inch.
 Contact Spring Tension—18 to 20 oz.
 Timing—See detailed instructions P. 1, Sec. AA.
 1—Locate T. D. C. 2—Locate rotor. 3—Set spark.
 Spark Plugs—Metric (AC type G-10); Gap .025 inch.
 Firing Order—1-5-3-6-2-4.
 Automatic Advance—20 degrees (on Flywheel).

Eng RPM	Degree Advance (on flywheel)	Dist RPM	Degree Advance (on cam)
800	0	400	0
1600	4	800	2
2400	10	1200	5
3000	14	1500	7
4000 (Max)	20	2000	10

Coil—Auto-Lite, IG-4065.
 Switch—"Electrolock", type 9-B. For details of operation and instructions on servicing see P. 22, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAM-4101

Performance Data—Gen. cold.

Amps	RPM	Volts	Amps.	R.P.M.	Volts
0	550	6.5	14	950	7.9
2	600	6.9	16	1100	8.
5	650	7.1	17	1350	8.
10	800	7.8			

Motoring Freely—4½-5½ amps. at 6 volts.

Max. Stall Current—18-19 amps. at 6 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Brush Spring Tension—22 to 25 oz. on main; 30 to 34 oz. on third.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4016

Closes—7-7.5 volts.

Opens—½-2½ amps. discharge.

Contact Gap—.025-.035 inch.

Core Gap—.010-.030 inch, contacts closed.

LIGHTING

Switch—Clum No. 10717.

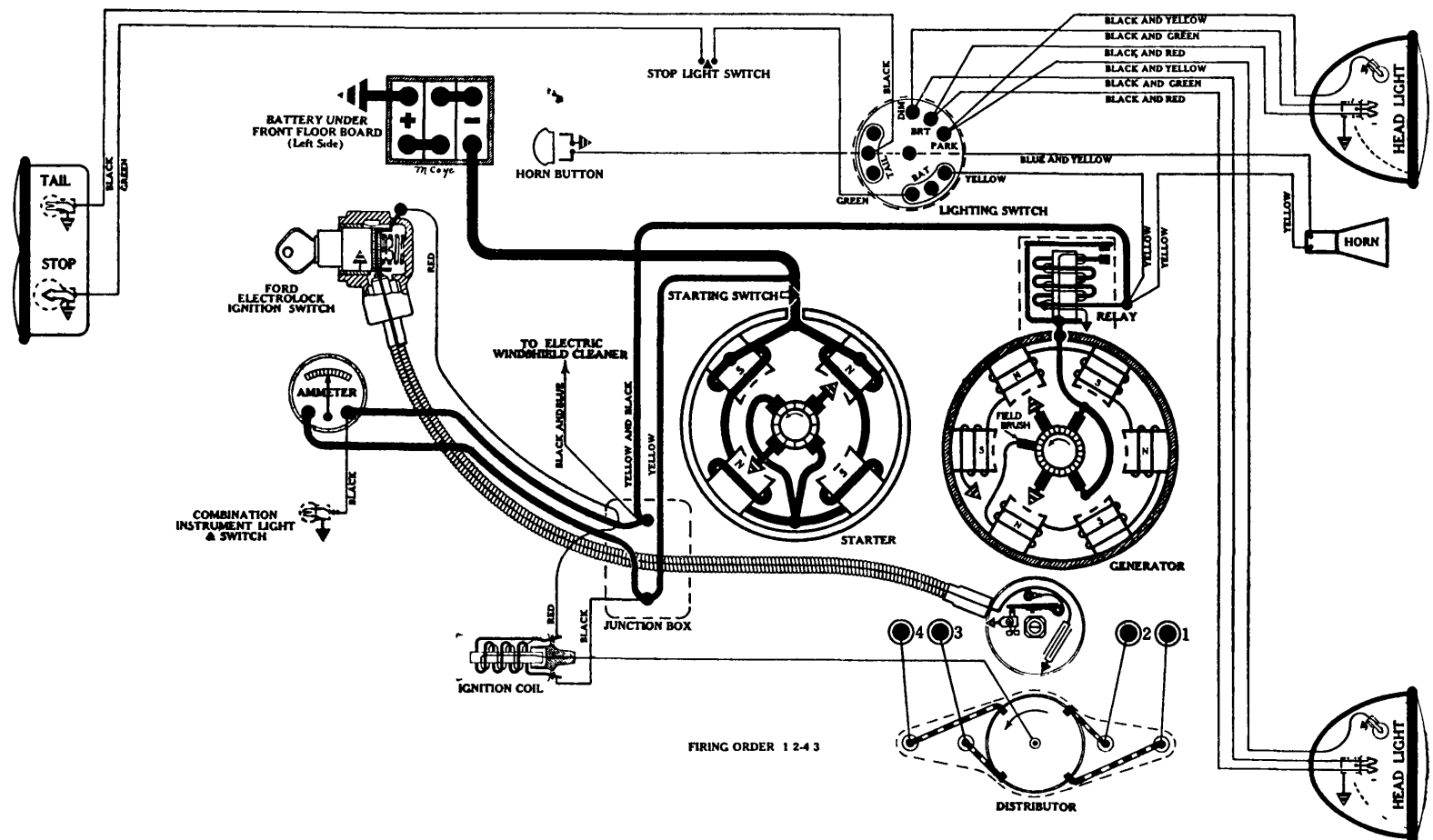
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse mounted in combination fuse and junction block, under engine hood (left side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); INSTRUMENT—63; TAIL—63; SIDE—63; DOME—63; STOP—87.

FORD

Model A, (1929)



BATTERY

Ford, A-10655, 6 volts. Positive Terminal Grounded
 Starting Capacity—98 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 17 hours.
 Box—Length, 9 $\frac{3}{8}$; width, 7 $\frac{1}{2}$; height, 9 $\frac{1}{2}$ inches

STARTER

Rotation, L. H., Com. End
 Ford

For Performance Data refer to 1928 Ford, Model "A"

Connection to Engine—Bendix drive.

IMPORTANT NOTE: The Abell drive was abandoned about Oct. 1, 1928. Cars after No. 492511 equipped with Bendix drive (Ford part #A-11850-G). At the same time flywheel was redesigned, making it impossible to use the new type starting motor on early model cars. The original Abell drive should be replaced by a special Bendix drive (Ford part #A-11850-DR). For full particulars on Ford starting motor changes, and instructions on how to install the special Bendix service starter drive on Model "A" cars and trucks manufactured previous to Oct., 1928. See P. 29, Sec. AA.

IGNITION

Rotation, L. H., Top View
 Ford

Breaker—Contact separation .015 to .018 inch.

IMPORTANT: (Check contact separation with care. Do not exceed these limits.)

Contact Spring Tension—16 to 18 oz.

NOTE: Special contact spring and stud assembly may be installed in early distributors. See P. 30, Sec. AA.

Timing—1—Check contact separation. 2—Retard spark lever. 3—Screw out TIMING PIN found in timing case cover, and insert rounded end in same hole. 4—Hand crank engine until pin is felt to drop in recess in cam shaft gear. 5—Remove Distributor cap and rotor button. 6—Loosen cam locking screw. 7—Replace rotor button and turn until metal strip is opposite No. 1 contact. 8—Remove rotor button and turn cam slightly L. H. (top view) until contacts just open. 9—Lock cam; assemble head; replace timing pin.

Spark Plugs— $\frac{7}{8}$ " special (AC type Z); Gap .025 inch.

Firing Order—1-2-4-3.

Manual Advance—38 degrees (on Flywheel).

Automatic Advance—None.

Coil—Auto-Lite-Ford.

Ignition Switch—Special "Electrolock." For details of operation and tests see P. 17, Sec. "AA".

GENERATOR

Rotation, L. H., Com. End
 Ford, Six Pole

Performance Data—Gen. cold.

Amps	RPM	Volts	Amps.	RPM.	Volts
0	725	6.5	10	1050	7.8
2	750	6.6	12	1125	7.9
4	800	7	14	1300	7.9
5	825	7.1	14 $\frac{1}{2}$	2200	7.9

Motoring Freely—2.4 amps. at 6 volts.

Max. Stall Current—24 amps. at 6 volts.

Field Test—2.3 amps. at 6 volts.

Brush Spring Tension—16-18 oz. on each.

Third Brush Adjustment—Remove Generator End Cover. Loosen field brush screw. Move in direction of rotation to increase rate. Relock.

NOTE: Adjusting slot allows an extreme charging rate if brush moved to limit.

RELAY

Ford

Closes—7-7 $\frac{1}{2}$ volts.

Opens—0-2.5 amps. discharge.

Contact Gap—.015-.020 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Ford No. A-11654-B.

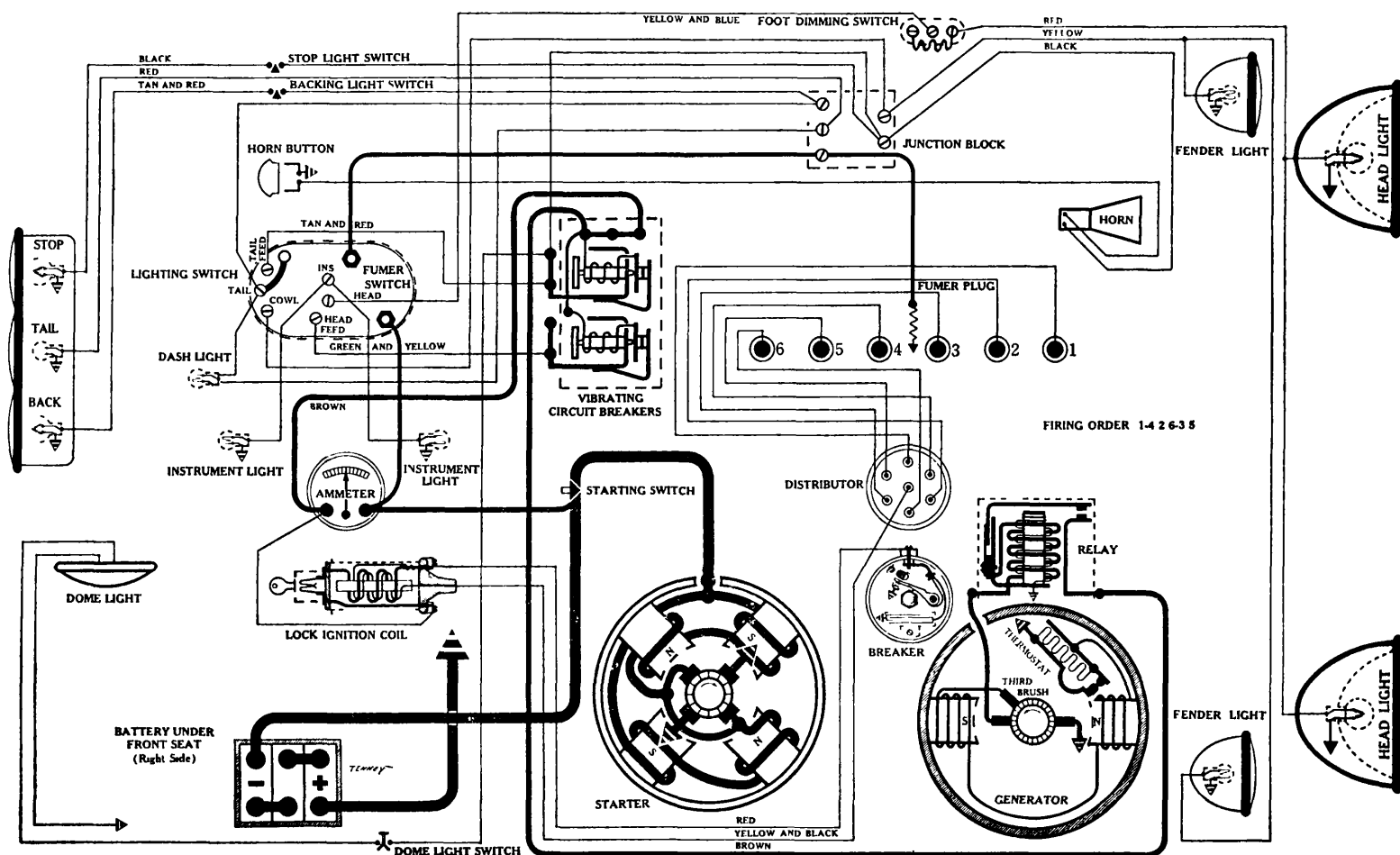
Location—Foot of steering column. Lights controlled by lever on steering wheel. Wires soldered to terminals.

Fuses—None.

Lamps—HEAD—1110 (Bifocal); AUX.—63; STOP—1129; TAIL—63.

FRANKLIN

Models 130, 135 and 137, (1929).



BATTERY

U. S. L., XY-19-X6, 6 volts. Positive Terminal Grounded
Starting Capacity—153 amps. for 20 minutes.
Lighting Capacity—5 amps. for 27½ hours.
Box—Length, 13 1/16; width, 7 7/16; height, 9¼ inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 723-C

Connection to Engine—Bendix drive.

NOTE: Gear reduction job. Pinion cut on armature shaft drives pinion on Bendix shaft.

Running Free—70 amps. at 5 volts, 3500 R. P. M.

Cranking Engine—160-170 amps. at 4.6 volts.

Lock Torque—22 pound-feet, 600 amps., 3 volts.

Brush Spring Tension—24-28 oz. on each.

Starting Switch—Delco-Remy, 404-W.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 640-T

Breaker—Contact separation .022 inch.

Contact Spring Tension—17 to 21 oz.

Timing—Set ignition with spark fully advanced. Remove engine air housing over fan that "arrowhead" on fan rim may be observed. No. 1 cylinder in firing position when arrowhead is 1½ inch ahead of engine center line (generator side).

Spark Plugs—Semi-metric "Aircraft" (AC type N-1); Gap .025 inch.

Firing Order—1-4-2-6-3-5.

Manual Advance—18 degrees (on Flywheel).

Automatic Advance—39 degrees (on Flywheel).

Eng R P M	Degrees Advance (on flywheel)	Dist R P M	Degrees Advance (on cam)
400	0-2	200	0 1
800	10	400	5
1200	18	600	9
1800	28	900	14
2400	39	1200	19 5

Coil—Delco-Remy, 528-X (with two primary connections).
Delco-Remy, 528-W (with three primary connections
—used with electric gasoline gauge).
Ignition Switch—Integral with coil.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 945-Y

Performance Data—Gen. cold. (No thermostat used).

Amps	R P M.	Volts	Amps.	R P M.	Volts
0	575	6.5	14	1400	7.9
5	800	7.1	16	1600 (Max.)	8.
9	1000	7.5	15	1800	8.
12	1200	7.8			

Motoring Freely—5-5½ amps. at 6 volts.

Max. Stall Current—15-17 amps. at 6 volts.

Field Test—3 amps. at 6 volts across field coils in series.

Field Fuse—6 amps.

Brush Spring Tension—14 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7½ volts.

Opens—0-2½ amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

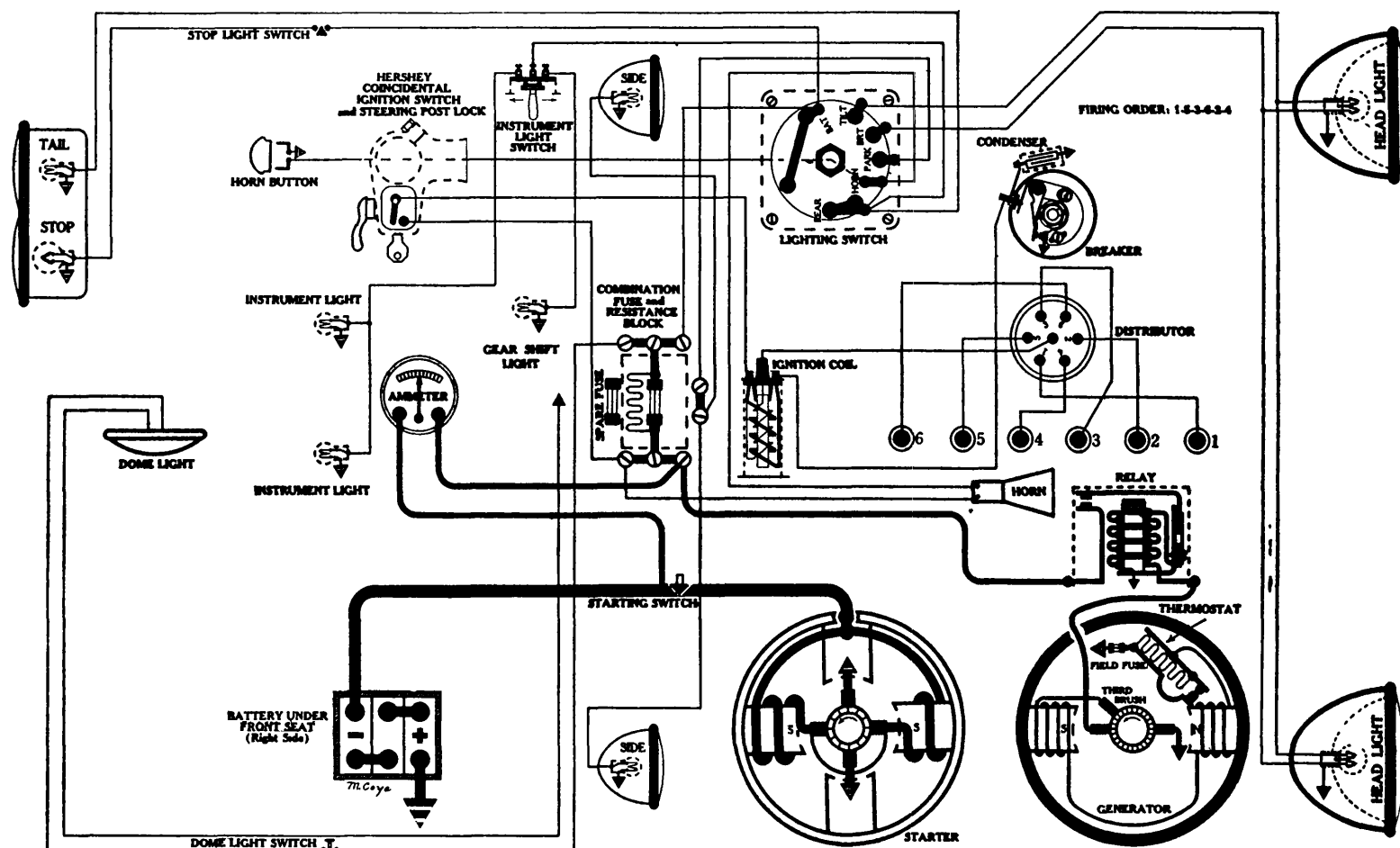
Switch—Soreng Manegold, type 5150-A. Combination lighting and primer switch.

Vibrating Circuit Breakers—Start 25-30 amps. Operate 10-15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1129; FENDER—63; DASH—61; INSTRUMENT—63; DOME—63; CORNER—63; STOP—1129; BACK—1129; TAIL—61.

GRAHAM-PAIGE

Model 612, (1929)



BATTERY

Willard, WSB-13, 6 volts. Positive Terminal Grounded
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17 hours.
Box—Length, 9 1/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 713-K

Connection to Engine—Bendix drive.
Running Free—65 amps. at 5 volts, 5000 R. P. M.
Cranking Engine—175-180 amps. at 4.5 volts.
Lock Torque—12 pound-feet, 475 amps., 3.6 volts.
Brush Spring Tension—24-28 oz. on each.
Starting Switch—Delco-Remy, 406-A.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 639-V

Breaker—Contact separation .018 to .022 inch.
Contact Spring Tension—17 to 21 oz.
Timing—See detailed instructions P. 1, Sec. AA.
1—Locate T. D. C. 2—Locate rotor. 3—Set spark.
Spark Plugs—7/8" long (AC type Z); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Manual Advance—30 degrees (on Flywheel).
Automatic Advance—20 degrees (on Flywheel).
Eng. R. P. M. Degrees Advance Dist. R. P. M. Degrees Advance
(on flywheel) (on cam)
600 0 300 0
1000 4 500 2
1500 8 750 4
2000 12 1000 6
2400 16 1200 8
2800 (Max) 20 1400 10
Coil—Delco-Remy, 528-C.
Switch—Hershey "Coincidental" — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-Q

Performance Data—Gen. cold.			Thermostat clos d.		
Amps.	R. P. M.	Volts	Amps.	R. P. M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE Thermostat opens about 165° F., reducing charging rate approx 30-40%

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Field Fuse—6 amps.

Brush Spring Tension—16-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7 1/2 volts.

Opens—0-2 1/2 amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton No. 40585.

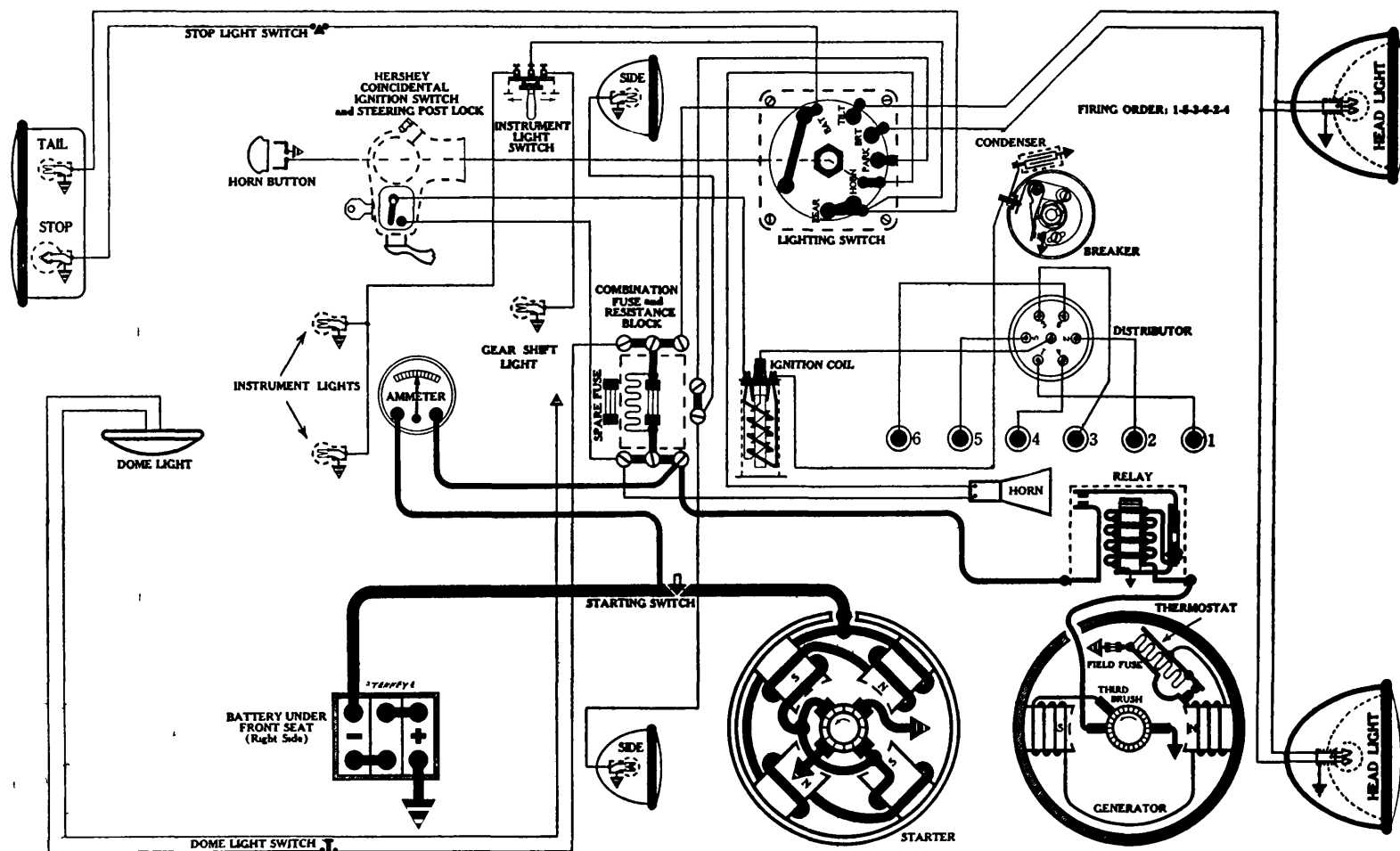
Location—Foot of steering column. Lights controlled by lever n steering wheel.

Fuse—20 amp. fuse and spar fuse mounted on North East fuse block and resistance assembly No. 22045.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; DOME—63; GEAR SHIFT LIGHT—63; STOP—1129; TAIL—63.

GRAHAM-PAIGE

Model 615, (1929)



BATTERY

Willard, WSB-15, 6 volts. Positive Terminal Grounded
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours
Box—Length, 10 5/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 718-E

Connection to Engine—Bendix drive.
Running Fre —65 amps. at 5 volts, 6000 R. P. M.
Cranking Engine—160-175 amps. at 4.3 volts.
Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
Brush Spring Tension—24-28 oz. on each.
Starting Switch—Delco-Remy, 406-A.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 639-W

Breaker—Contact separation .018 to .022 inch.
Contact Spring Tension—17 to 21 oz.
Timing—See detailed instructions P. 1, Sec. AA.
1—Locate T. D. C. 2—Locate rotor. 3—Set spark.
Spark Plugs—7/8" long (AC type Z); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Manual Advance—30 degrees (on Flywheel)
Automatic Advance—20 degrees (on Flywheel)

Eng R P M	Degrees Advance (on flywheel)	Dist R P M	Degrees Advance (on cam)
400	0	200	0
800	4	400	2
1300	8	650	4
1700	12	850	6
2200	16	1100	8
2600 (Max)	20	1300	10

Coil—Delco-Remy, 528-C.

Switch—Hershey "Coincidental" — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 957-B

Performance Data—Gen. cold. Thermostat closed.

Amps	R P M	Volts	Amps	R P M	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5 1/2 amps at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Field Fuse—6 amps.

Brush Spring Tension—16-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7-7 1/2 volts.

Opens—0-2 1/2 amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton No. 40585.

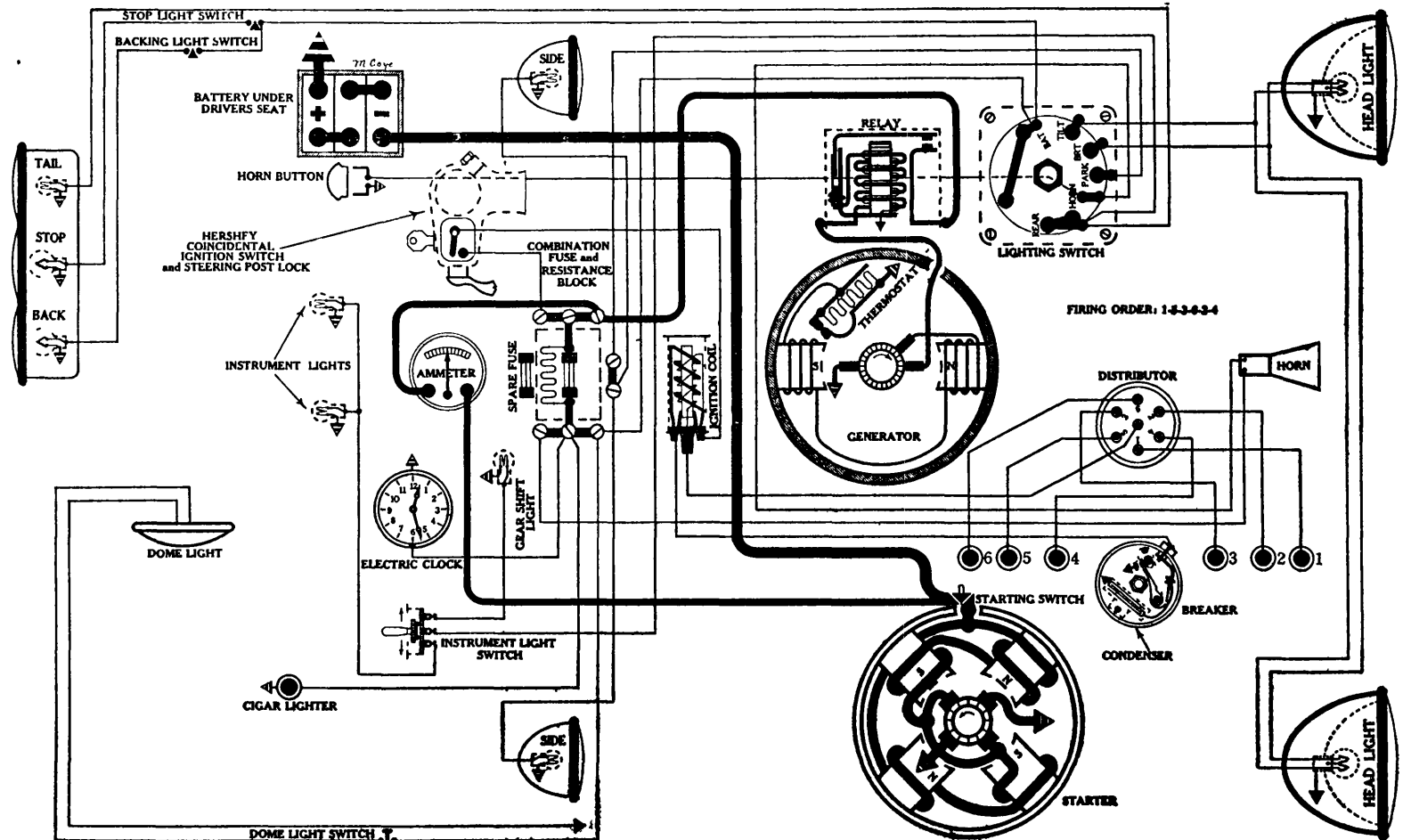
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuse—20 amp. fuse and spare fuse mounted on North East fuse block and resistance assembly No. 22045.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; DOME—63; GEAR SHIFT LIGHT—63; STOP—1129; TAIL—63.

GRAHAM-PAIGE

Model 621, (1929)



BATTERY

Willard, WSB-17, 6 volts. Positive Terminal Grounded
Starting Capacity—130 amps. for 20 minutes.
Lighting Capacity—5 amps. for 23 hours.
Box—Length, 11 11/16; width, 7 1/16; height, 9 1/4 inches

STARTER

Rotation, L. H., Com. End
Delco-Remy, 725-G

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R. P. M.
Cranking Engine—165-185 amps. at 4.2 volts.
Lock Torque—16 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 640-U

Breaker—Contact separation .018 to .022 inch.

Contact Spring Tension—17 to 21 oz.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—7/8" long (AC type Z); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—30 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel)

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	0	200	0
800	4	400	2
1200	8	600	4
1600	12	800	6
2000	16	1000	8
2400	20	1200	10
2600 (Max)	22	1300	11

Coil—Delco-Remy, 528-C.

Switch—Hershey "Coincidental" — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, R. H., Com. End
Delco-Remy, 957-C

Performance Data—Gen. cold. Thermostat clos d.

Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE Thermostat opens about 165° F, reducing charging rate approx 80-40%

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Field Fuse—6 amps.

Brush Spring Tension—16-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton No. 40585.

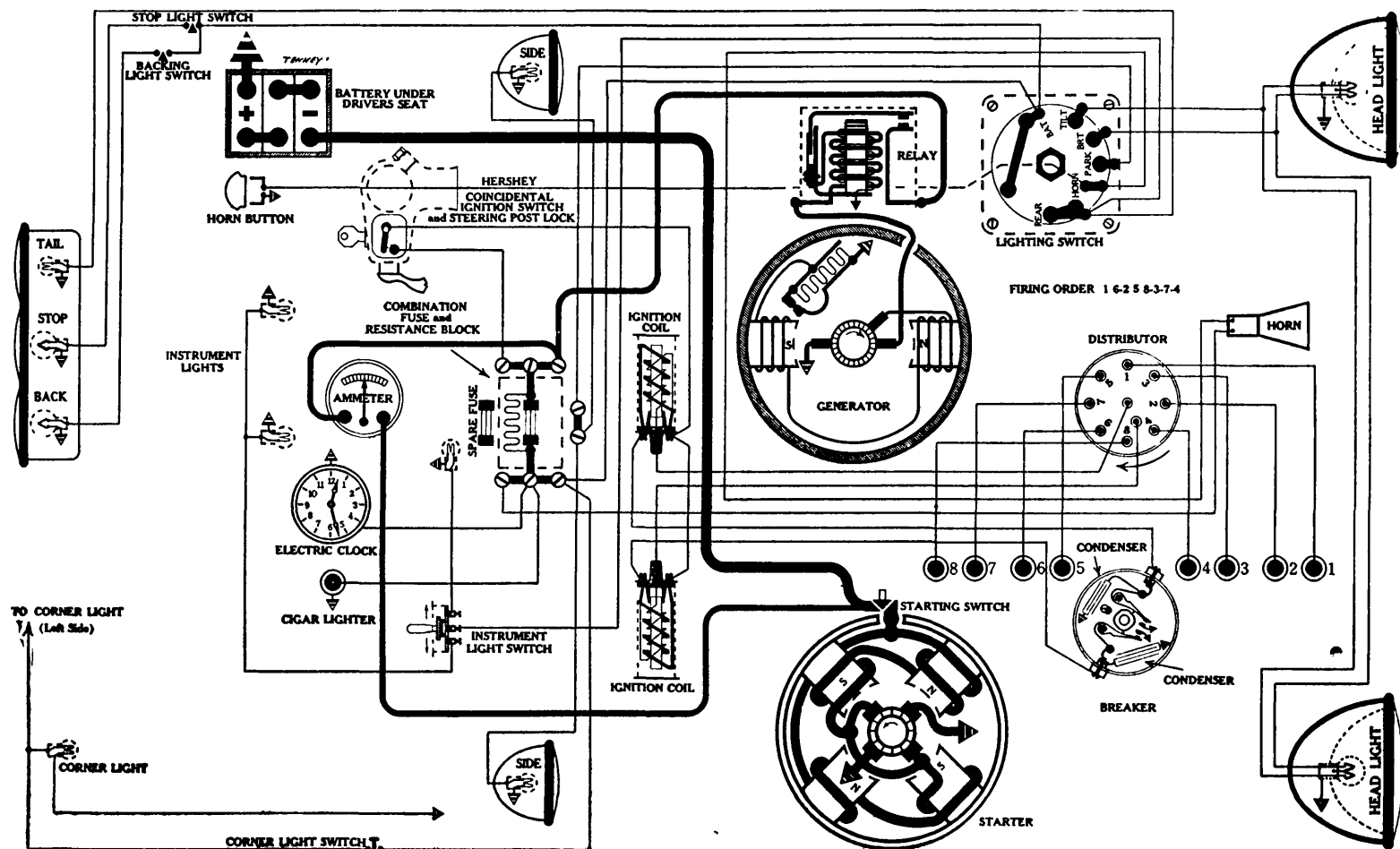
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuse—20 amp. fuse and spare fuse mounted on North East fuse block and resistance assembly No. 22045.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; DOME—63; GEAR SHIFT LIGHT—63; STOP—1129; TAIL—63; BACKING—1129.

GRAHAM-PAIGE

M dels 827 and 837, (1929)



BATTERY

Willard, WSB-17, 6 volts. Positive Terminal Grounded
Starting Capacity—130 amps. for 20 minutes.
Lighting Capacity—5 amps. for 23 hours.
Box—Length, 11 11/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 725-G

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R. P. M.

Cranking Engine—165-185 amps. at 4.2 volts.

Lock Torque—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 668-D

IMPORTANT NOTE This unit uses a 4-lobe cam, two independent breaker arms and two coils. The arms must be accurately synchronized to operate at intervals of 15 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw is provided which moves one breaker assembly. Adjust by using Delco-Remy synchronizing tool #18035009 or rotary spark gap on test bench. See detailed instructions P. 26 Sec. AA.

Breakers—Contact separation .022 inch.

Contact Spring Tension—17 to 21 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—S mi-Metric "Aircraft" (AC type N-1); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	0	200	0
1200	8	600	4
2000	16	1000	8
2400	20	1200	10
2600 (Max)	22	1300	11

Coil—Delco-Remy, 528-C.

Switch—Hershey "Coincidental" — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, R. H., Com. End
Delco-Remy, 957-C

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19.	1700	8.3
11	1000	7.9			

NOTE: Thermostat opens about 160° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Field Fuse—6 amps.

Brush Spring Tension—16-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton No. 40585.

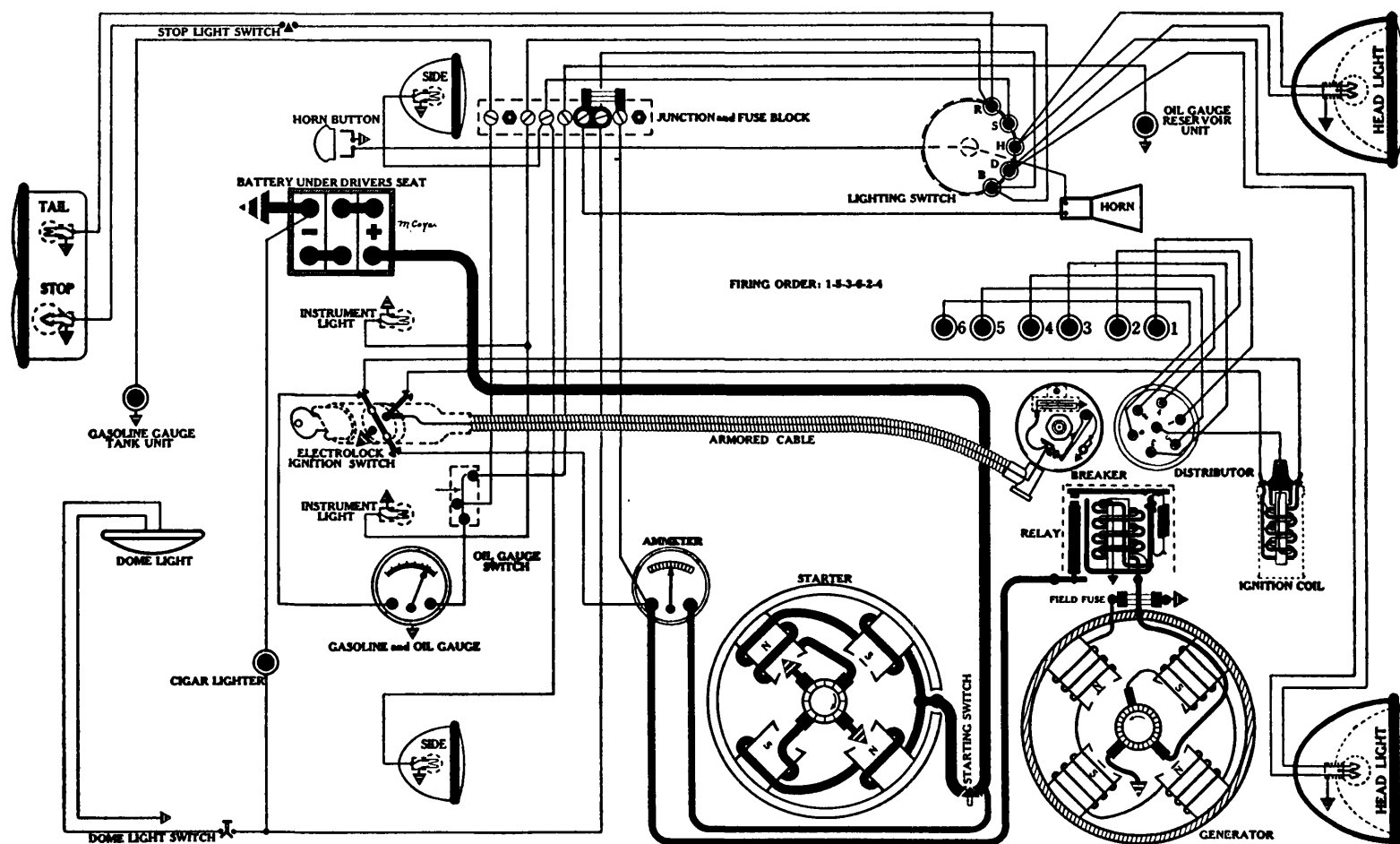
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuse—20 amp. fuse and spare fuse mounted on North East fuse block and resistance assembly No. 22045.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; DOME—63; GEAR SHIFT LIGHT—63; STOP—1129; TAIL—63; BACKING—1129.

HUDSON

Model, The Greater Hudson Super-Six, (1929)



BATTERY

Exide, 3-VXA-15-1, 6 volts. Negative Terminal Grounded
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 1/8; width, 7 5/32; height, 9 3/16 inches.

STARTER

Rotation, R. H., Com. End
Auto-Lite, MUA-4001

Connection to Engine—Thru reduction gears manually shifted.

Running Free—40 amps. at 6 volts, 5000 R. P. M.

Cranking Engine—160-200 amps. at 5.2 volts.

Lock Torque—12-15 pound-feet, 450-500 amps., 3 1/2-4 volts.

Brush Spring Tension—20 to 26 oz. on each.

Starting Switch—Located under starter sub-frame.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGA-4058

NOTE: Contact spring is looped around stud and riveted. To change points without dismantling unit, crush loop with pliers, and replace with 1928 style spring.

Breaker—Contact separation .020 to .024 inch.

Contact Spring Tension—18 to 20 oz.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—Long Metric (AC type G-10); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—28 degrees (on Flywheel).

Automatic Advance—36 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0	300	0
1200	8	600	4
1750	16	875	8
2200	22	1100	11
2600	28	1300	14
3200 (Max.)	36	1600	18

Coil—Aut-Lite, IG-4065.

Ignition Switch—"Electrolock", type 9-B. For details of operation and instructions on servicing, see P. 22, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAB-4008

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	550	6.5	14	950	7.9
2	600	6.9	16	1100	8.
5	650	7.1	17	1350	8.
10	800	7.8			

Motoring Freely—4 1/2-5 1/2 amps. at 6 volts.

Max. Stall Current—18-19 amps. at 6 volts.

Field Test—6 1/2 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7-7.5 volts.

Opens—1/2-2 1/2 amps. discharge.

Contact Gap—.025-.035 inch.

Core Gap—.010-.030 inch, contacts closed.

LIGHTING

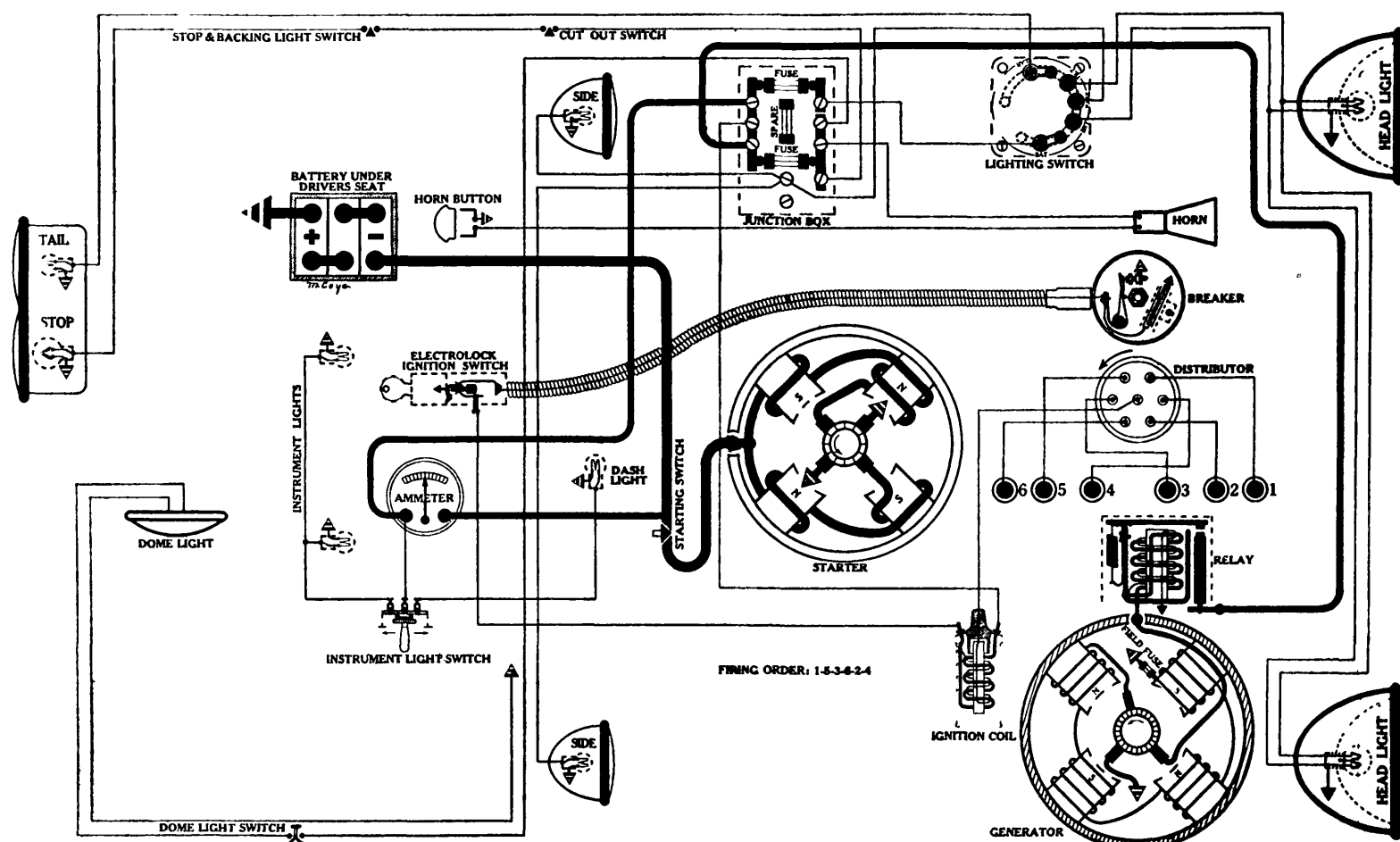
Switch—Clum No. 10717 or Soreng Maneg Id No. 2560-A.
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse mounted on combination fuse and junction block, under engine hood (left side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); INSTRUMENT—63; TAIL—63; SIDE—63; DOME—63; STOP—87.

HUPMOBILE

Model A, 6 cyl., (1929)



BATTERY

Willard, RSB-15, 6 volts. Positive Terminal Grounded
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MN-4109

Connection to Engine—Bendix drive
Running Free—50 amps. at 5.5 volts.
Cranking Engine—130 amps. at 4.8 volts, 160 R. P. M.
Lock Torque—12.5 pound-feet, 450 amps., 3.4 volts.
Brush Spring Tension—1 1/4-1 1/2 lbs. on each.
Starting Switch—Auto-Lite, SW-4002.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGC-4003

Breaker—Contact separation .020 to .024 inch.
Contact Spring Tension—18-20 oz.
Timing—See detailed instructions P. 1, Sec. AA
1—Locate T. D. C. 2—Locate rotor. 3—Set spark.
Spark Plugs—7/8" long (AC type Z); Gap .025 inch.
Manual Advance—30 degrees (on Flywheel).
Automatic Advance—16 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
1000	0	500	0
1600	4	800	2
2600	10	1300	5
3600	16	1800	8

Coil—Auto-Lite, IG-4065.

Ignition Switch—"Electrolock", type A. For details of operation and instructions on servicing, see P. 17, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAJ-4106

Performance Data—Gen. cold.

Amps	RPM	Volts
0	600	6.5
2	625	6.6
5	850	7.
10	1075	7.3
14	1340	7.7
16	1450	8.

Motoring Freely—5 1/2-6 amps. at 6 volts.
Max. Stall Current—17-19 amps. at 6 volts.
Field Test—3 amps. at 6 volts across field coils in series.
Field Fuse—5 amps.
Brush Spring Tension—20 to 24 oz. on each.
Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4012

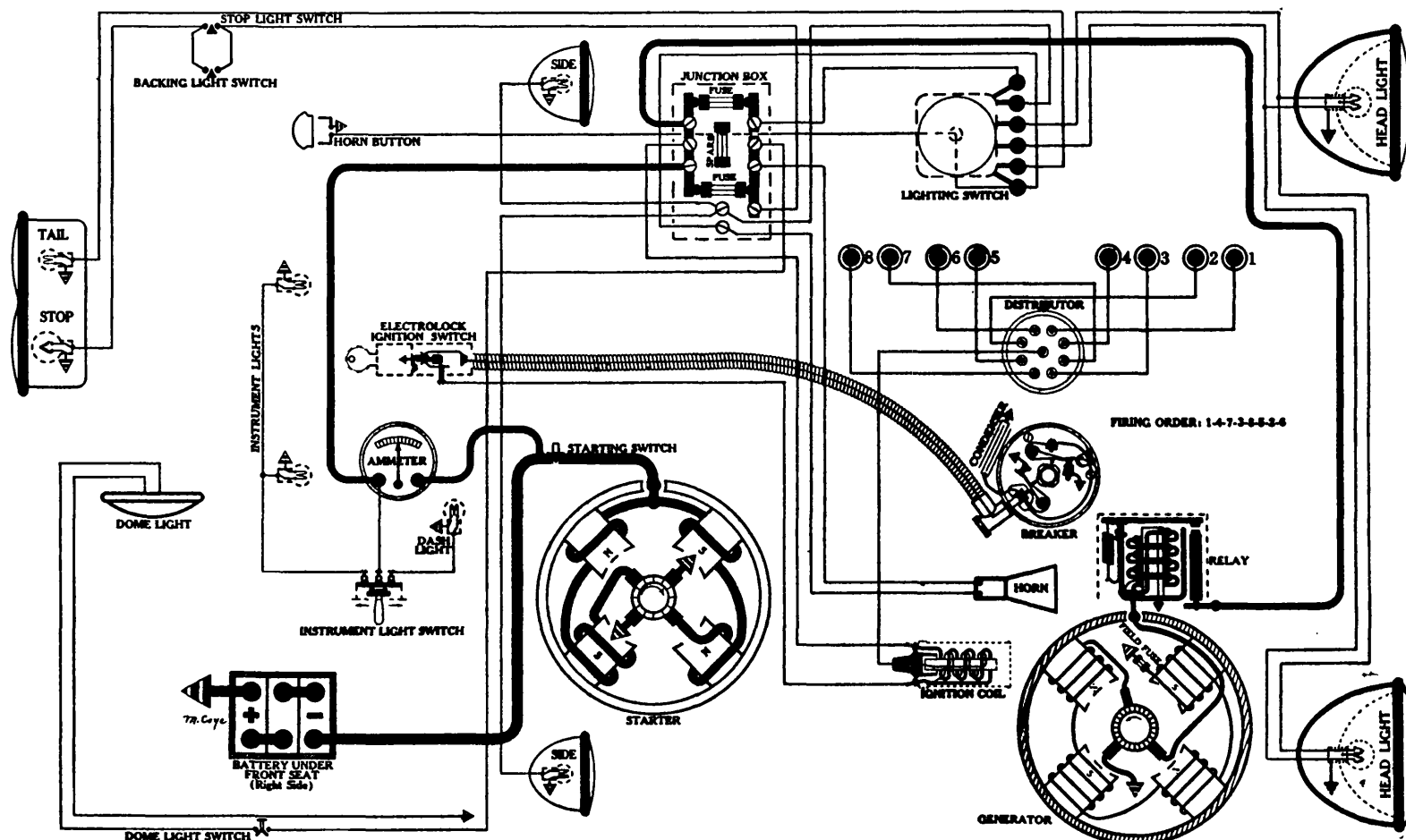
Closes—7-7.5 volts.
Opens—1 1/2-2 1/2 amps. discharge.
Contact Gap—.025-.035 inch.
Core Gap—.010-.030 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton (Hupmobile No. 63564).
Location—Foot of steering column. Lights controlled by lever on steering wheel.
Fuses—Two 15 amp. fuses in box under hood (left side).
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; TAIL—63; STOP and BACK—87.

HUPMOBILE

Mod I M, Straight Eight, (1929)



BATTERY

Willard, SJRR-4, 6 volts. Positive Terminal Grounded
 Starting Capacity—125 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 22 hours.
 Box—Length, 10 5/16; width, 7 1/16; height, 9 3/4 inches.

STARTER

Rotation, R. H., Com. End
 Auto-Lite, ML-4139

Connection to Engine—Bendix drive.
 Running Free—70 amps. at 5.8 volts.
 Cranking Engine—125 amps. at 5.4 volts, 145 R. P. M.
 Lock Torque—19 pound-feet, 425 amps., 2.5 volts.
 Brush Spring Tension—1 1/4-1 1/2 lbs. on each.

IGNITION

Rotation, R. H., Top View
 Auto-Lite, IGH-4002

IMPORTANT NOTE: This unit uses a four-lobe cam with two breaker arms connected in parallel. Cam is so designed that one point is open when other is just breaking but closes few degrees after break occurs. The arms must be accurately synchronized to operate at intervals of exactly 45 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw is provided which moves one breaker point assembly. For detailed instructions on synchronizing see P. 25, Sec. AA.

Breaker—Contact separation .022 to .024 inch.
Contact Arm Spring Tension—18-20 oz. on each.
Timing—See detailed instructions P. 1, Sec. AA.
 1—Locate T. D. C. 2—Locate rotor. 3—Set spark.
Spark Plugs—Semi-Metric "Aircraft" (AC type N-1); Gap .025 inch.

Firing Order—1-4-7-3-8-5-2-6.

Manual Advance—38 degrees (on Flywheel).

Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	0	400	0
1200	2	600	1
2000	6	1000	3
2800	12	1400	6
3600 (Max.)	16	1800	8

Coil—Auto-Lite, IG-4065.

Ignition Switch—"Electrolock", type A. For details of operation and instructions on servicing, see P. 17, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAG-4106

Performance Data—Gen cold.

Amps.	R.P.M.	Volts
0	525	6.5
2	550	6.6
5	650	7.
10	780	7.3
14	1200	7.7
17	1250	8.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—17-19 amps. at 6 volts.

Field Test—4.3 amps. at 6 volts across field coils in series.

Field Fuse—5 amps.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4012

Closes—7-7.5 volts.

Opens—1 1/2-2 1/2 amps. discharge.

Contact Gap—.025-.035 inch.

Core Gap—.010-.030 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton (Hupmobile No. 71043).

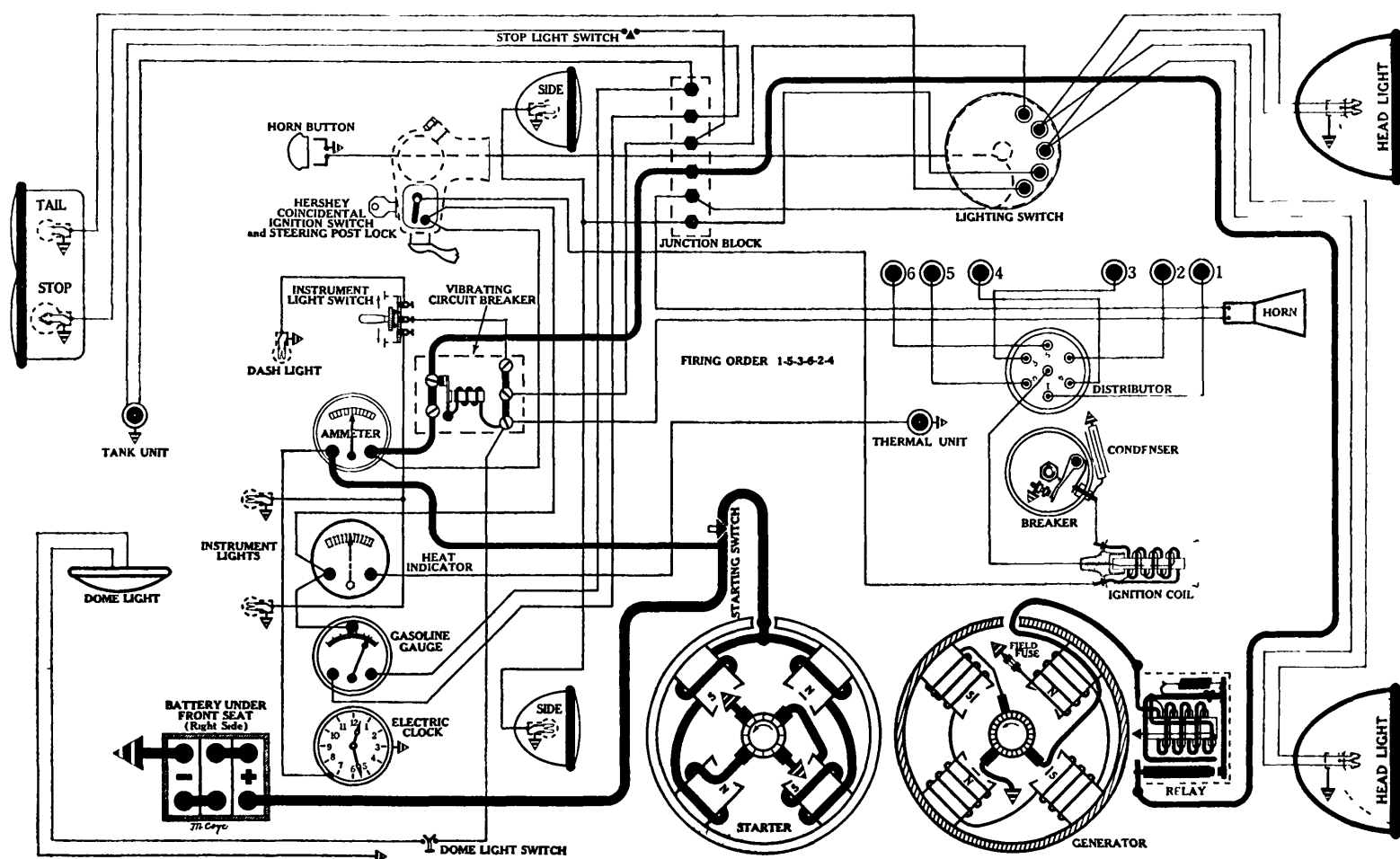
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two 15 amp. fuses in battery under hood (left side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; TAIL—63; STOP and BACK—87.

JORDAN

Model, 6-E, (1929)



BATTERY

Willard, WSB-15, 6 volts. Negative Terminal Grounded
 Starting Capacity—114 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 20 hours.
 Box—Length, 10 5/16; width, 7 1/16; height, 9 1/4 inches

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAD-4104

Connection to Engine—Bendix drive
 Running Free—50 amps. at 5.5 volts.
 Cranking Engine—160 amps. at 5.25 volts, 228 R. P. M.
 Lock Torque—13.6 pound-feet, 540 amps., 3 volts.
 Brush Spring Tension—20 to 24 oz. on each.
 Starting Switch—Auto-Lite, SW-4002.

IGNITION

Rotation, R. H., Top View
 Auto-Lite, IGB-4006-A

Breaker—Contact separation .020 to .024 inch.
 Contact Spring Tension—18-20 oz.
 Timing—See detailed instructions P. 1, Sec. AA
 1—Locate T. D. C. 2—Locate rotor. 3—Set spark
 Spark Plugs—Regular Metric (AC type G); Gap .025 inch.
 Firing Order—1-5-3-6-2-4.

Manual Advance—20 degrees (on Flywheel)

Automatic Advance—20 degrees (on Flywheel)

NOTE: A few early productions used the IGB 4006 A Distributor, with a 30 degree (flywheel) automatic advance. When overhauling, the governor assembly should be changed to conform with the following table

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
600	0	300	0
1000	4	500	2
2000	12	1000	6
2800 (Max)	20	1400	10

Coil—Auto-Lite, IG-4066.

Switch—Hershey "Coincidental" — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAG-4114

Performance Data—Gen. cold.

Amps	RPM	Volts
0	525	6.5
2	550	6.6
5	650	7
10	780	7.3
14	1200	7.7
17	1250	8

Motoring Freely—5-5 1/2 amps. at 6 volts

Max. Stall Current—17-19 amps at 6 volts.

Field Test—4.3 amps. at 6 volts across field coils in series

Field Fuse—5 amps.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. Sec Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4007

Closes—7-7.5 volts.

Opens—1/2-2 1/2 amps. discharge

Contact Gap—.025-.035 inch.

Core Gap—.010-.030 inch, contacts closed.

LIGHTING

Switch—Soreng Manegold No. 5600-A.

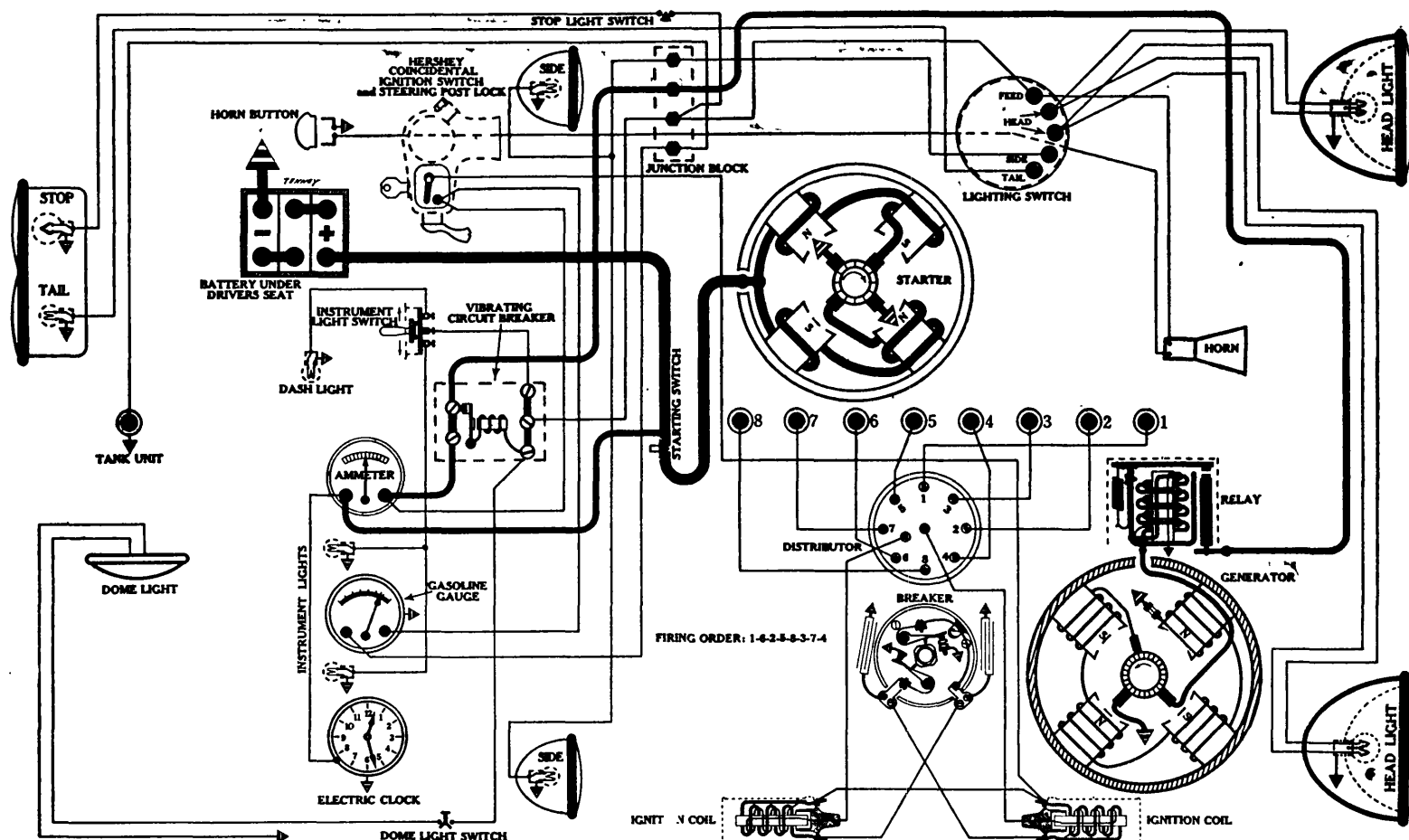
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Behind instrument board Kellogg No. 568. Feed for horn, lighting switch, stop light, and inside lights, take thru this unit. Starts 25-30 amps. Op rates 10-15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal), SIDE—63; STOP—87; INSTRUMENT—63; TAIL—63; DOME—63.

JORDAN

Model, 8-G (Straight Eight), (1929)



BATTERY

Willard, WSB-15, 6 volts. Negative Terminal Grounded
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, R. H., Com. End
Auto-Lite, MUA-4007

Connection to Engine—Bendix drive.

NOTE: Gear reduction job. A pinion cut on armature shaft drives a pinion on Bendix shaft.

Running Free—70 amps. at 5 volts, 2500 R. P. M.

Cranking Engine—185-195 amps. at 4.3 volts.

Lock Torque—27 pound-feet, 575 amps., 3 volts.

Brush Spring Tension—20 to 24 oz. on each.

Starting Switch—Auto-Lite, SW-4202.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGJ-4001-A

IMPORTANT NOTE: This unit uses a 4-lobe cam, two independent breaker arms, and two coils. The arms must be accurately synchronized to operate at intervals of 45 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw is provided which moves one breaker assembly. See detailed instructions P. 25, Sec. AA.

Breaker—Contact separation .022 to .024 inch.

Contact Arm Spring Tension—18 to 20 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—Regular Metric (AC type G); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—24 degrees (on Flywheel).

Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance
(on flywheel) (on cam)

500.....	0-2.....	250.....	0-1.....
1200.....	8.....	600.....	4.....
2400.....	18.....	1200.....	9.....
3400.....	24.....	1700.....	12.....

Coils—Auto-Lite, IG-4078.

Switch—Hershey "Coincidental" — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAG-4109

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0.....	525.....	6.5.....	10.....	780.....	7.3.....
2.....	550.....	6.6.....	14.....	1200.....	7.7.....
5.....	650.....	7.....	17.....	1250.....	8.....

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—17 to 19 amps. at 6 volts.

Field Test—4.3 amps. at 6 volts across field coils in series.

Field Fuse—5 amps.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4012

Closes—7 to 7.5 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Soreng Manegold No. 5600-A.

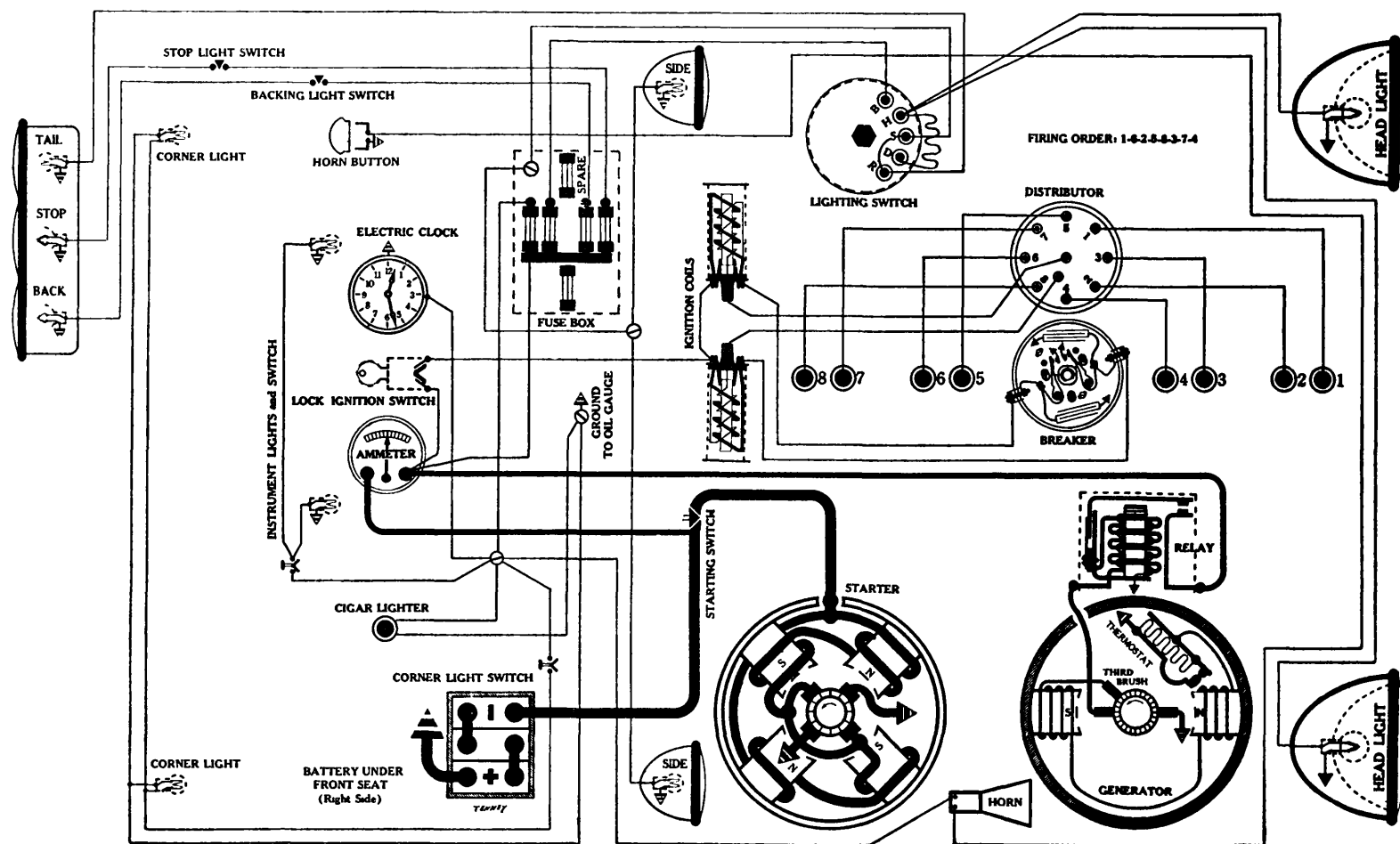
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Behind instrument board. Kellogg No. 568. Feed for horn, lighting switch, stop light, and inside lights, take thru this unit. Starts 25-30 amps. Operates 10-15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; STOP—87; INSTRUMENT—63; TAIL—63; DOME—63.

KISSEL

Model 126, (1929-30)



BATTERY

Willard, SJWR-4, 6 volts. Positive Terminal Grounded
Starting Capacity—125 amps. for 20 minutes.
Lighting Capacity—5 amps. for 22 hours.
Box—Length, 10 5/16; width, 7 1/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 720-Q

Connection to Engine—Bendix drive
Running Fr e—65 amps. at 5 volts, 6000 R. P. M.
Cranking Engine—185-190 amps. at 4.1 volts.
Lock Torque—15 pound-feet, 570 amps., 3.1 volts.
Brush Spring Tension—24-28 oz. on each.
Starting Switch—Delco-Remy, 406-A.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 668-B

IMPORTANT NOTE This unit uses a 4-lobe cam, two independent breaker arms and two coils. The arms must be accurately synchronized to operate at intervals of 45 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw is provided which moves one breaker assembly. Adjust by using Delco-Remy synchronizing tool #18035009 or rotary spark gap on test bench. See detailed instructions P. 26, Sec. AA

Breakers—Contact separation .022 inch.

Contact Spring Tension—17 to 21 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—7/8" regular (AC type A); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—19 degrees (on Flywheel).

Eng RPM	Degree Advance (on flywheel)	Dist RPM	Degree Advance (on cam)
600	0 2	300	0 1
1000	4	500	2
1500	8	750	4
2500	14	1250	7
3200	19	1600	9 5

Coils—Delco-Remy, 528-C.

Ignition Switch—Clum No. 4790 (combined lock and switch).

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 941-W

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE The most it opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 1/2 to 5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7 1/2 volts.

Opens—0-2 1/2 amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Clum No. 10677.

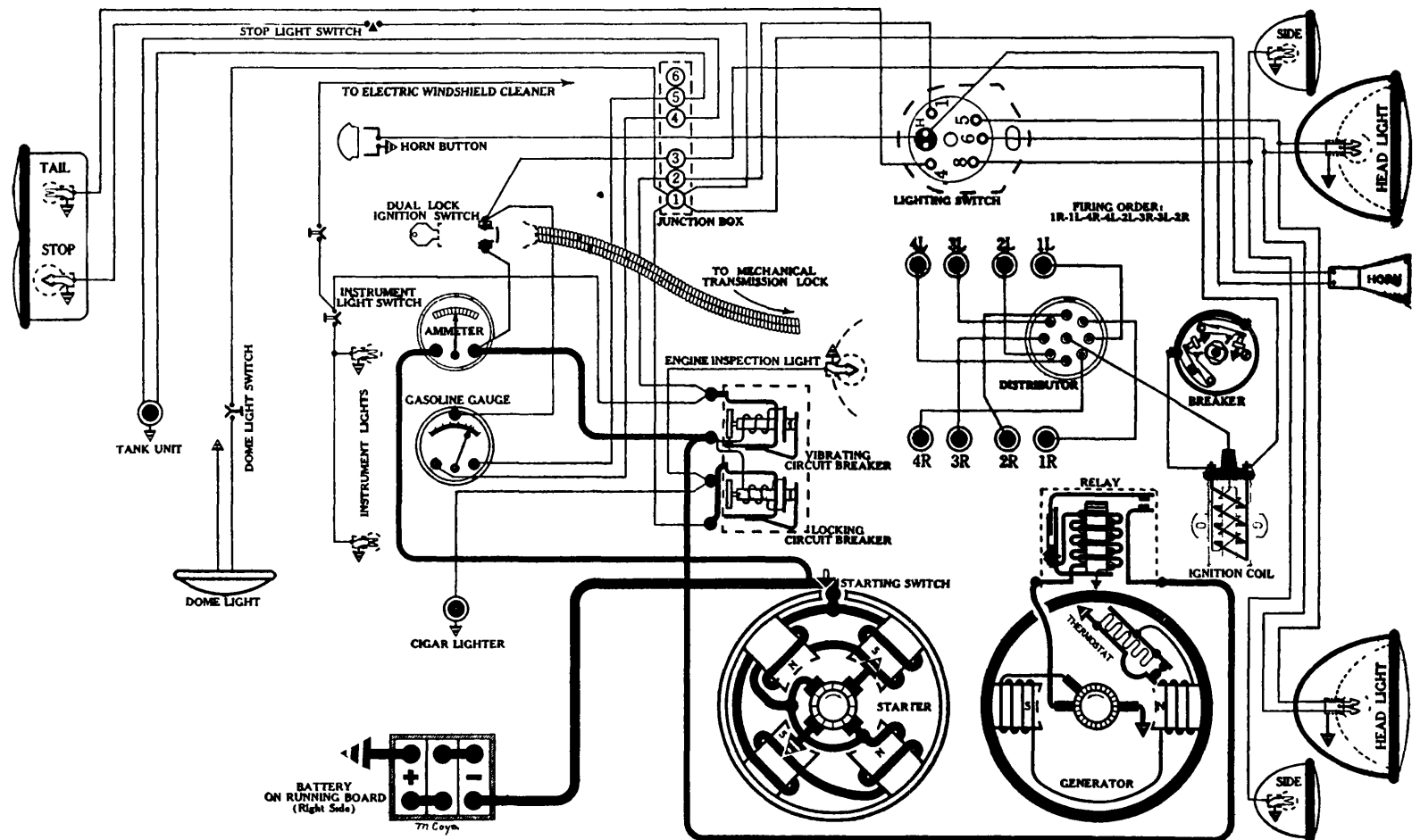
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Four, 10 amp. fuses with two spares in fuse box under engine hood (left side).

Lamps—See P. 3, Sec. AA. HEAD—1129; SIDE—63; INSTRUMENT—63; BODY—63; TAIL—63; STOP—87; BACK—87.

LA SALLE

Model 328, (1929)

**BATTERY**

Exide, 3-MXV-15-1R, 6 volts. Positive Terminal Grounded
 Starting Capacity—133 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 26½ hours.
 Box—Length, 10 3/16; width, 7 1/8; height, 9 11/32 inches.

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 725-C

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R. P. M.

Cranking Engine—200-220 amps. at 4.5 volts.

Lock Torque—16 pound-feet, 625 amps. at 3 volts.

Brush Spring Tension—24-28 oz. on each.

Starting Switch—Mounted on Starter.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 4041 or 4042

IMPORTANT NOTE. This unit uses a four-lobe cam with double breaker arms connected in parallel. Cam is so designed that one point is open when other is just breaking, the two sets of breakers must be accurately located to operate at intervals of exactly 45 degrees of distributor shaft travel, corresponding to 90 degrees of flywheel. An eccentric adjusting screw is provided which moves but one breaker assembly, after loosening screws. An accurate adjustment may be made by use of calibrated template—see P. 9, Sec. AA.—or by use of special designed breaker gauge supplied by Delco-Remy Corp.

Breakers—Contact separation .025 to .027 inch.

Contact Spring Tension—16-20 oz. on each

Timing—See detailed instructions P. 1, Sec. AA

1—Locate T D C 2—Locate rotor 3—Set spark
 Special Timing with full advance on spark lever With No. 1 cylinder in firing position Flywheel mark "IG/A-1/5" will be at indicator on crank case

Firing Order—1L-4R-4L-2L-3R-3L-2R-1R.

Spark Plugs—7/8" Semi-Aircraft (AC type Y); Gap .025 inch.

Manual Advance—38 degrees (on Flywheel).

Automatic Advance—30 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
1000	0-2	500	0-1
1500	6-8	750	3-4
2500	14-16	1250	7-8
3000	22-24	1500	11-12
3800	28-30	1900	14-15

Coil—Delco-Remy, 2195.

Ignition Switch—Delco-Remy, 426-A or 426-E, "Dual Lock" (Combination Ignition Switch and Mechanical Transmission Lock.)

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 384

Performance Data—Gen. cold. Thermostat closed.

Amps	R.P.M.	Volts
0	575	6.5
3	700	7.
6	800	7.1
11	1000	7.9
15	1200	8.1
20	1450 (Max)	8.3
19	1700	8.3

NOTE Thermostat opens about 165° F, reducing charging rate approx. 80-40%.

Motoring Freely—3½-4 amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—2.1 amp. at 6 volts, across field coils in series.

Brush Spring Tension—16-20 oz. on each.

Third Brush Adjustment—Loosen Cover Band. See Fig. 13, P. 7, Sec. AA.

RELAY

Delco-Remy, 266-N

Closes—7-7½ volts.

Opens—0-2 amps. discharge.

Contact Gap—.015 to .025 inch.

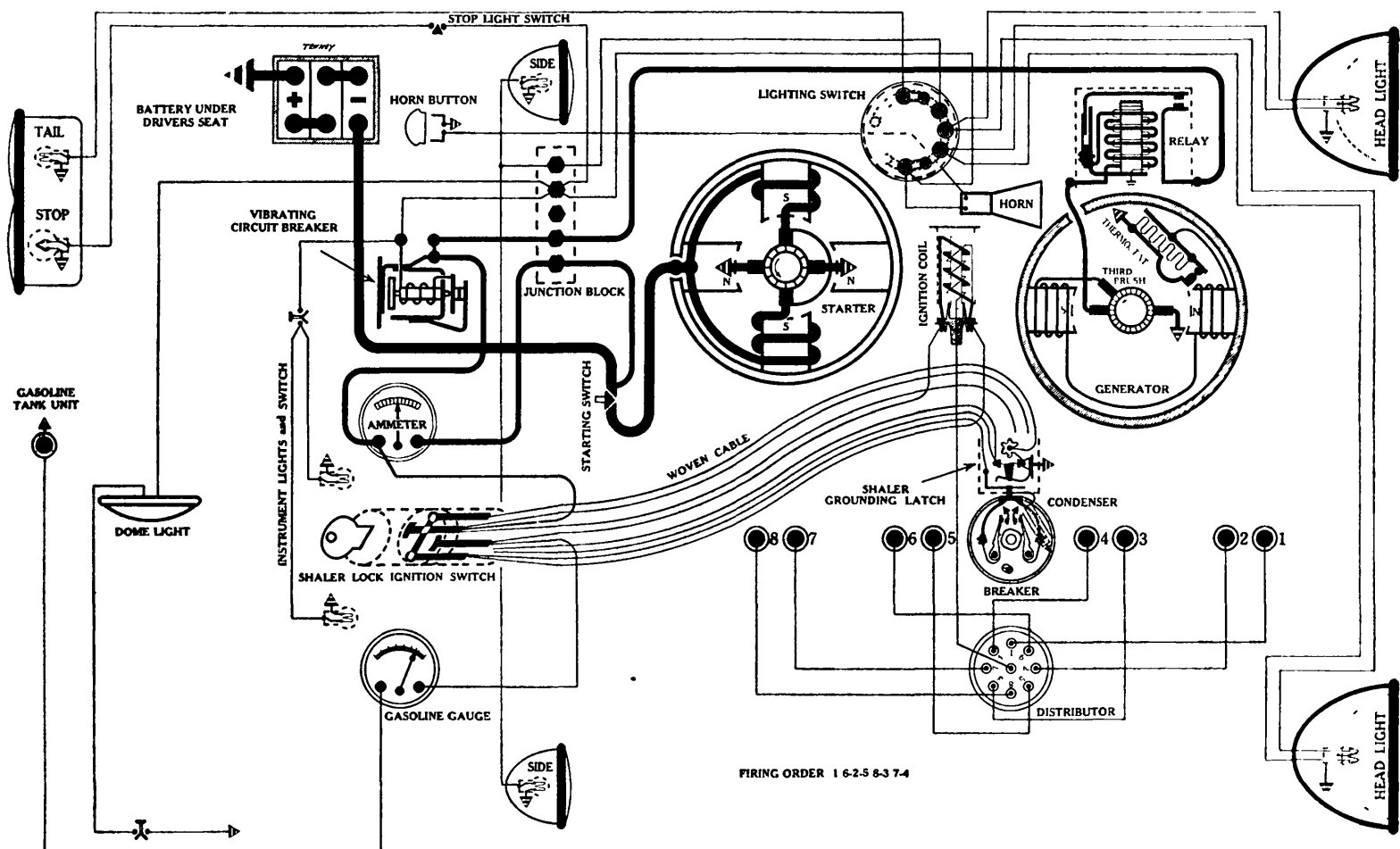
Cor. Gap—.014 to .018 inch, contacts closed.

LIGHTING

(SAME AS CADILLAC MODEL 341-B, 1929)

MARMON

Mod 1 68, (1929)



FIRING ORDER 1-6-2-5-8-3-7-4

BATTERY

Prest-O-Lite, 6-15-J, 6 volts. Positive Terminal Grounded
Starting Capacity—120 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7; height, 9 1/8 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-G

Connection to Engine—Bendix drive.
Running Free—65 amps. at 5 volts, 5000 R. P. M.
Cranking Engine—175-180 amps. at 4.5 volts.
Lock Torque—12 pound-feet, 475 amps., 3.6 volts.
Brush Spring Tension—24-28 oz. on each.
Starting Switch—Delco-Remy, 405-C.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 651-A

IMPORTANT NOTE This unit uses a four-lobe cam with two breaker arms connected in parallel. Cam is so designed that one point is open when other is just breaking but closes few degrees after break occurs. The arms must be accurately synchronized to operate at intervals of exactly 45 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw "A" is provided, which moves one breaker assembly. Adjust by using Delco-Remy synchronizing tool No. 820738 or rotary spark gap on test bench. See detailed instructions P. 13, Sec. AA.

Breakers—Contact separation .022 inch.

Contact Spring Tension—15-20 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—7/8" long body (AC type I); Gap .027 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—25 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
500	0-2.5	250	0-1.25
1000	5-10	500	2.5-5
2000	16.5-21.5	1000	8.25-10.25
2600	21.5-26.5	1300	10.75-13.25

Coil—Delco-Remy, 525-C.

Ignition Switch—Shaler Lock Switch. For details of operation and instructions on servicing, see P. 23, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 949-X

Performance Data—Gen. cold			Thermostat closed.		
Amps	RPM	Volts	Amps	RPM	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE Thermostat opens about 155° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 1/2 to 5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7 1/2 volts.

Opens—0-2 1/2 amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton No. 40599.

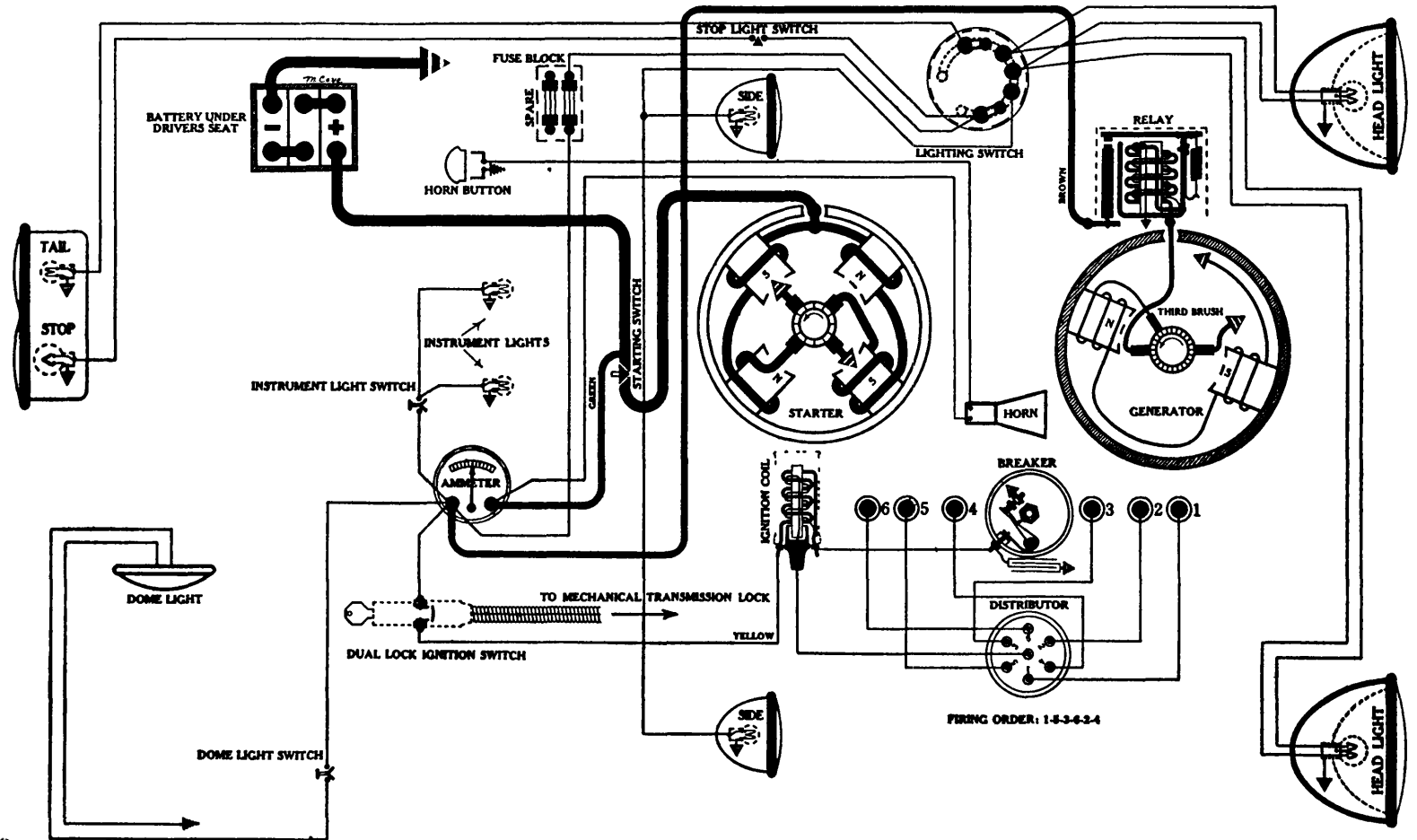
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25-30 amps. Operates 10-15 amps.

Lamps—See P. 3, Sec. AA. **HEAD**—1110 (Bifocal); **SIDE**—63; **INSTRUMENT**—63; **DOME**—63; **TAIL**—63; **STOP**—87.

NASH

Model, Standard Six, Series 400, (1929)



BATTERY

U. S. L., 3-HVX-5X-6, 6 volts. Negative terminal grounded
 Starting Capacity—106 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 18 hours.
 Box—Length, 9 1/16; width, 7 7/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAC-4213

Connection to Engine—Bendix drive.
 Running Free—50 amps. at 5.5 volts.
 Cranking Engine—160 amps. at 4.7 volts, 184 R. P. M.
 Lock Torque—11.5 pound-feet, 540 amps., 3 volts.
 Brush Spring Tension—20 to 24 oz. on each.
 Starting Switch—Auto-Lite, SW-4001.

IGNITION

Rotation, R. H., Top View
 Auto-Lite, IGB-4015

(Full Automatic Spark Advance)

Breaker—Contact separation .020 to .024 inch.
 Contact Spring Tension—18-20 oz.
 Timing—See detailed instructions P. 1, Sec. AA.
 1—Locate T. D. C. 2—Locate rotor. 3—Set spark.
 Spark Plugs—Regular Metric (AC type G); Gap .023 inch.
 Firing Order—1-5-3-6-2-4.
 Automatic Advance—28 degrees (on Flywheel).
 Manual Advance—(None).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0	300	0
1000	4	500	2
1600	10	800	5
2400	18	1200	9
3000	24	1500	12
3400 (Max)	28	1700	14

 Coil—Auto-Lite, IG-4065.

Ignition Switch—Delco-Remy, 425-E "Dual Lock" (combination ignition switch and mechanical transmission lock).

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAL-4111

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	650	6.5	10	1075	7.3
2	720	6.6	14	1340	7.7
5	850	7	16	1800	8

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—16-19 amps. at 6 volts.

Field Test—4.7 amps. at 6 volts across field coils in series.

Field Fuse—(None).

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7-7.5 volts.

Opens—1 1/2-2 1/2 amps. discharge.

Contact Gap—.025-.035 inch.

Core Gap—.010-.030 inch, contacts closed.

LIGHTING

Switch—Soreng Manegold No. 4210-A.

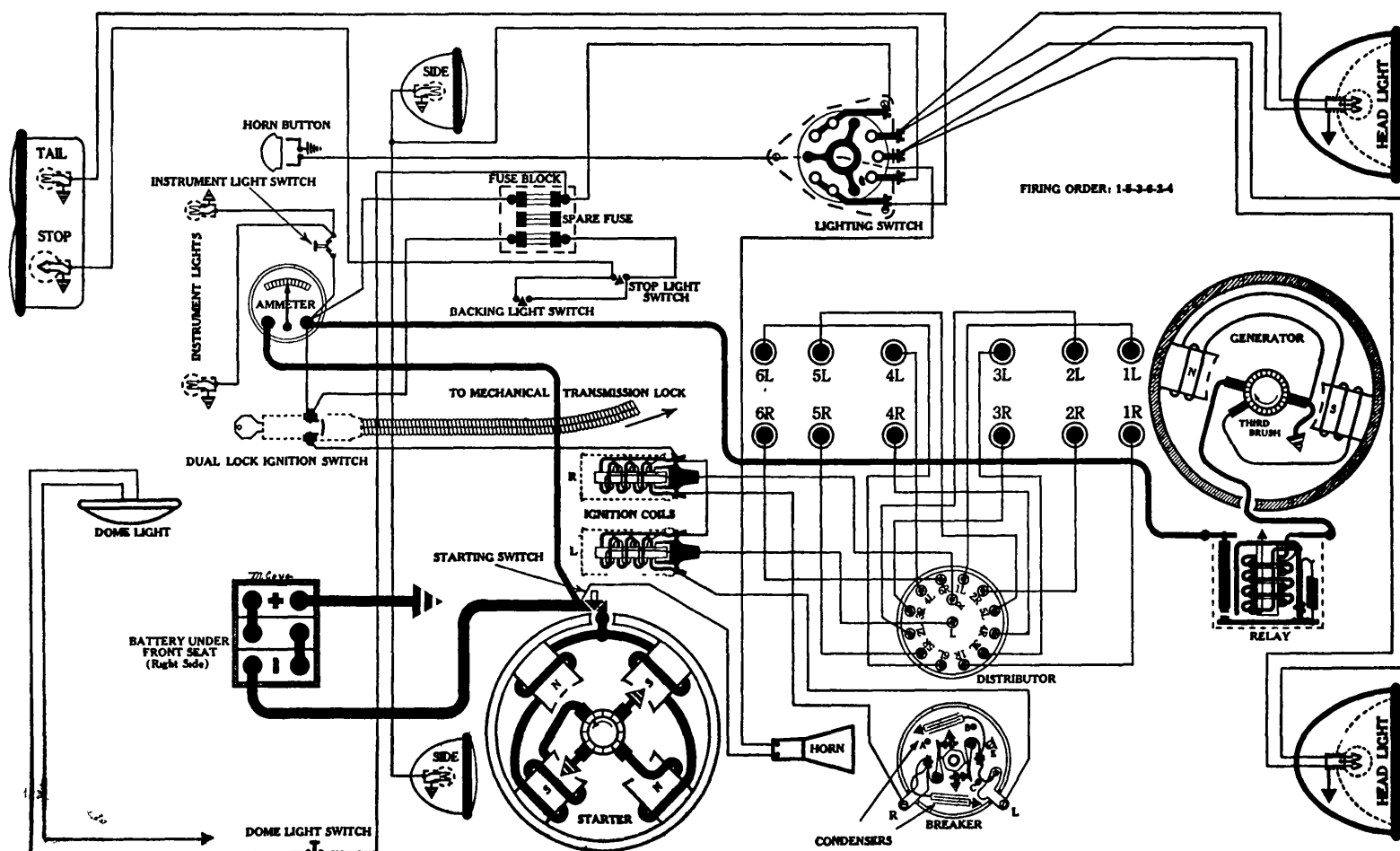
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two, 20 amp. fuses mounted on fuse block under engine hood (left side), on "alive", and one "spare".

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; TAIL—63; STOP—87; DOME—64.

NASH

Model, Advanced Six, Series 400, (1929)



BATTERY

U. S. L., 3-HVX-6X-6, 6 volts. Positive Terminal Grounded
Starting Capacity—127 amps. for 20 minutes.
Lighting Capacity—5 amps. for 23½ hours.
Box—Length, 10 7/16; width, 7; height, 9¾ inches

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAD-4102

Connection to Engine—Mechanical gear shift, incorporating an overrunning clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter.

Running Free—50 amps. at 5.5 volts.

Cranking Engine—160 amps. at 5.25 volts, 228 R. P. M.

Lock Torque—13.6 pound-feet, 540 amps., 3 volts.

Brush Spring Tension—1¼-1½ lbs. on each.

Starting Switch—Auto-Lite, SW-2677 (on motor).

IGNITION

Rotation, R. H., Top View
Auto-Lite, ICE-4001

IMPORTANT NOTE—Twin Ignition—This unit uses a single six lobe cam, with two breaker arms, two condensers, two coils, and two sets of spark plugs, operating entirely independent of one another. Both sets of points must be synchronized to break simultaneously. For detailed information on synchronizing see P. 23, Sec. "AA".

Breaker—Contact separation .022 to .024 inch.

Contact Spring Tension—22 to 26 oz.

NOTE—Contact spring tension exceptionally heavy. This tension must be maintained for smooth running and high speed performance.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—Metric SAE, (AC type J); Gap. .023 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—28 degrees (on Flywheel).

Automatic Advance—30 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Degrees Advance Dist. Shaft R.P.M.	Degrees Advance (on cam)
600	0	300	0
1000	8	500	4
1600	20	800	10
2200 (Max.)	30	1100	15

Coils—Auto-Lite, IC-4065.

Ignition Switch—Delco-Remy, 425-D, E, "Dual Lock". (Combination ignition switch and mechanical transmission lock).

GENERATOR

Rotation, R. H., Com. End
Auto-Lite, GAO-4101

Performance Data—Gen. cold.

Amps	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	500	6.5	14	1200	8.
2	550	6.9	16	1300	8.1
6	800	7.3	18	1450 (Max.)	8.3
10	1000	7.8			

Motoring Freely—4 amps. at 6 volts.

Max. Stall Current—25 amps. at 6 volts.

Field Test—2½ amps. at 6 volts across field coils in series.

Field Fuse—(None).

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7-7.5 volts.

Opens—½-2½ amps. discharge.

Contact Gap—.025-.035 inch.

Core Gap—.010-.030 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-C.

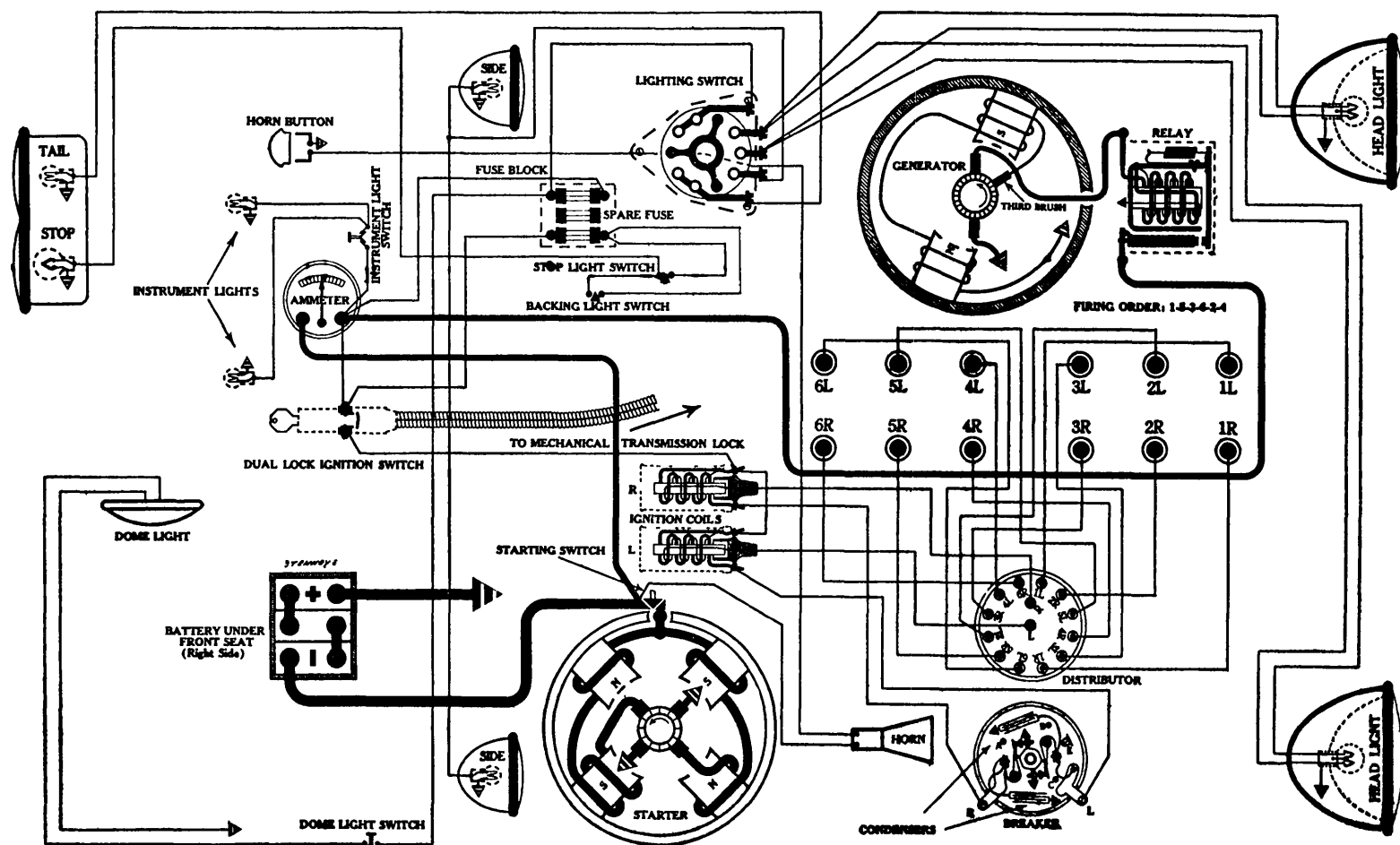
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two 20 amp. fuses mounted on dash, left side, under hood.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; STOP—87; TAIL—63; DOME—64.

NASH

Model, Special Six, Series 400, (1929)



BATTERY

U. S. L., 3-HVX-5X-6, 6 volts. Positive Terminal Grounded
Starting Capacity—106 amps. for 20 minutes.
Lighting Capacity—5 amps. for 18 hours.
Box—length, 9 1/16; width, 7 7/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAD-4102

Connection to Engine—Mechanical gear shift, incorporating an overrunning clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter.

Running Free—50 amps. at 5.5 volts.

Cranking Engine—160 amps. at 5.25 volts, 228 R. P. M.

Lock Torque—13.6 pound-feet, 540 amps., 3 volts.

Brush Spring Tension—1 1/4-1 1/2 lbs. on each.

Starting Switch—Auto-Lite, SW-2677 (on motor).

IGNITION

Rotation, R. H., Top View
Auto-Lite, Type IGE-4002

IMPORTANT NOTE: "Twin Ignition"—This unit uses a single six lobe cam, with two breaker arms, two condensers, two coils, and two sets of spark plugs, operating entirely independent of one another. Both sets of points must be synchronized to break simultaneously. For detailed information on synchronizing see P. 23, Sec. "AA".

Breaker—Contact separation .022 to .024 inch.

Contact Spring Tension—22 to 26 oz.

NOTE: Contact spring tension exceptionally heavy. This tension must be maintained for smooth running and high speed performance.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—"A.C.", type J (Metric SAE); Gap—.023 to .025 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—33 degrees (on Flywheel).

Automatic Advance—30 degrees (on Flywheel).

Eng. R.P.M. Degrees Advance Dist. Shaft R.P.M. Degrees Advance
(on flywheel) (on cam)

800	4	400	2
1600	20	800	10
2400 (Max.)	30	1200	15

Coils—Auto-Lite, IG-4065.

Ignition Switch—Delco-Remy, 425-D, E, "Dual Lock".
(Combination ignition switch and mechanical transmission lock).

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4108

Performance Data—Gen. cold.

Amps.	R.P.M.	V lts
0	650	6.5
2	720	6.6
5	850	7.
10	1075	7.3
14	1340	7.7
16	1800	8.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—16-19 amps. at 6 volts.

Field Test—4.7 amps. at 6 volts across field coils in series.

Field Fuse—(None.)

Brush Spring Tension—1 1/4 to 1 1/2 lbs. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4011

Closes—7-7.5 volts.

Opens—1/2-2 1/2 amps. discharge.

Contact Gap—.025-.035 inch.

Core Gap—.010-.030 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-C.

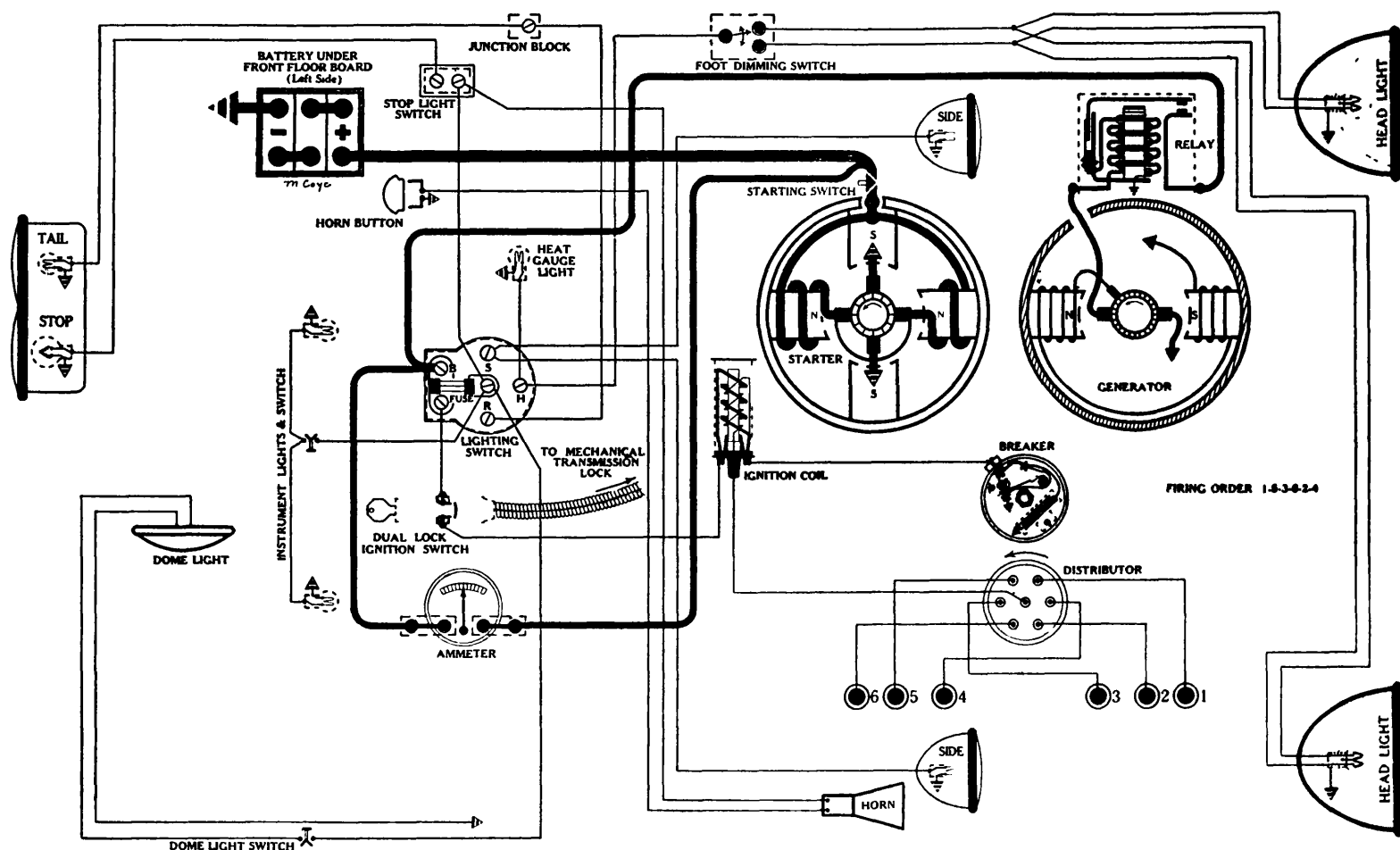
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two 20 amp. fuses mounted in dash, left side, under hood.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; STOP—87; TAIL—63; DOME—64.

OAKLAND

Model, All American Six, (1929)



BATTERY

Willard, WSB-15, 6 volts. Negative Terminal Grounded
 Starting Capacity—114 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 20 hours
 Length, 10 5/16; width, 7 1/16; height, 9 1/4 inches

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 714-F

Connection to Engine—Bendix drive.
 Running Free—65 amps. at 5 volts, 5000 R. P. M.
 Cranking Engine—175-180 amps at 4.5 volts.
 Lock Torque—12 pound-feet, 475 amps., 3.6 volts
 Brush Spring Tension—24-28 oz. on each.
 Starting Switch—Mounted on starter.

IGNITION

Rotation, L. H., Top View
 Delco-Remy, 640-K

(Full Automatic Spark Advance)

Breaker—Contact separation .022 inch.
 Contact Spring Tension—17 to 21 oz.
 Timing—See detailed instructions P. 1, Sec. AA
 1—Locate T. D. C. 2—Locate rotor. 3—Set spark
 Spark Plugs—7/8" long (AC type B); Gap .022 inch
 Firing Order—1-5-3-6-2-4.
 Manual Advance—(None).

Automatic Advance—22 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
600	0-2	300	0-1
1000	6	500	3
1800	14	900	7
2800	22	1400	11

Coil—Delco-Remy, 528-C.

Ignition Switch—Delco-Remy, 425-K, M, "Dual Lock".
 (Combination ignition switch and mechanical transmission lock).

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 949-N

Performance Data—Gen cold. No Thermostat.

Amps	RPM	Volts	Amps	R.P.M.	Volts
0	475	6.5	13	1200	7.9
3	600	7	16	1400 (Max.)	8.
7	800	7.2	15	1700	8.
10	1000	7.8			

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—15-18 amps. at 6 volts.

Field Test—4 1/2 to 5 amps. at 6 volts across field coils in series.

Brush Spring Tension—24-28 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B or 265-G

Closes—7-7 1/2 volts.

Opens—0-2 1/2 amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch. Contacts closed.

LIGHTING

Switch—Clum No. 10741.

Location—Behind instrument board. Operated by pull knob.

Fuse—Single 20 amp. fuse mounted on switch back.

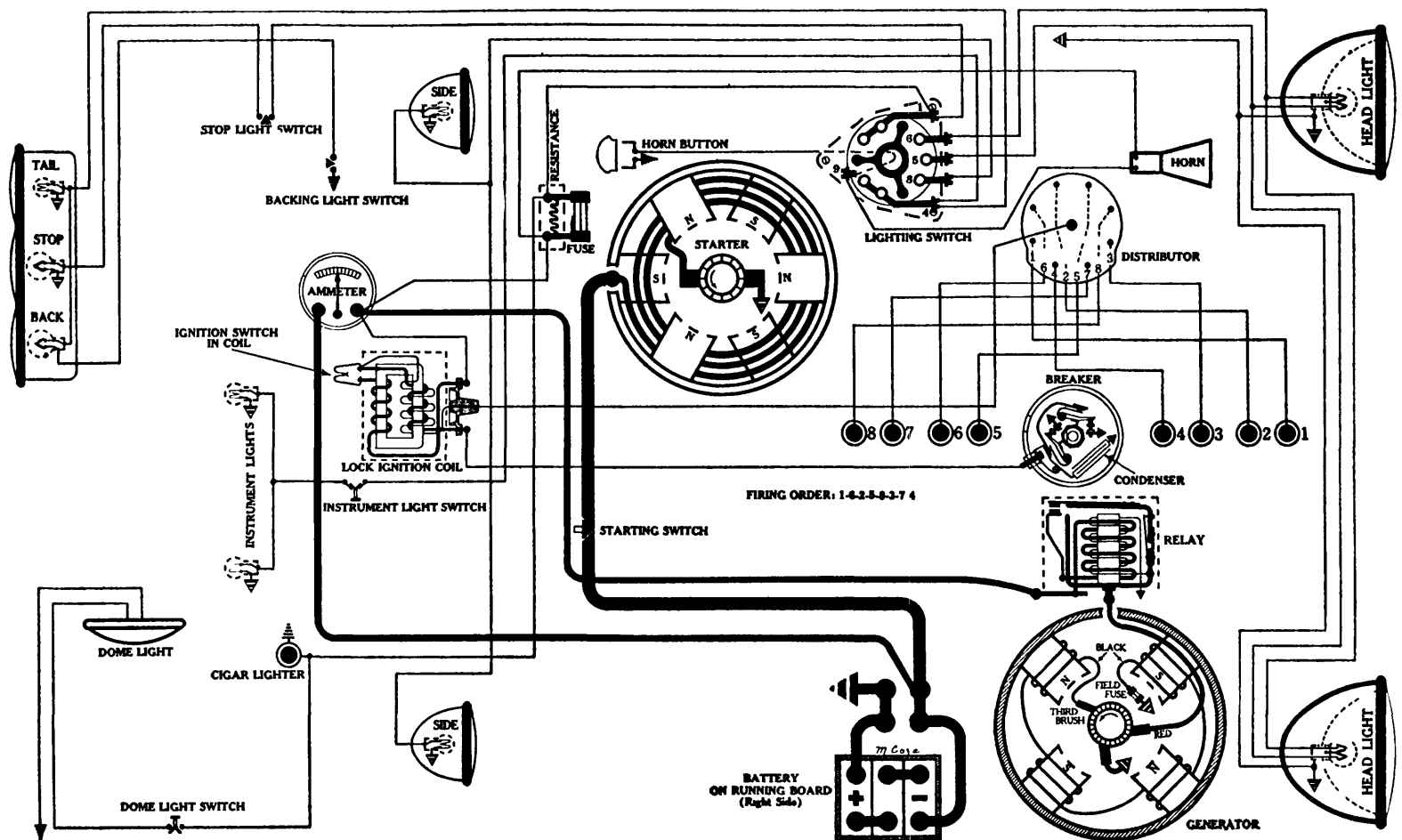
Foot Dimming Switch—Delco-Remy, 465-B.

Location—On to board (left side). Tilt beam controlled by pressing plunger by foot.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal), SIDE—63; INSTRUMENT—63; STOP—87; TAIL—63

PACKARD

Models 626, 633, Straight Eight, (1929)
Models 640, 645, Straight Eight, (1929)



BATTERY

Prest-O-Lite, A-6-15-S, 6 volts. Positive Terminal Grounded

Starting Capacity—135 amps. for 20 minutes.

Lighting Capacity—5 amps. for 22 hours.

Box—Length, 11 9/16; width, 7; height, 9 5/8 inches.

Prest-O-Lite, A-6-17-S. For data see 1928 Packard, Model 443.

STARTER

Rotation, L. H., Com. End
Owen Dyneto, Type DM-693

Connection to Engine—Bendix drive.

Running Free—50 amps. at 6 volts.

Cranking Engine—325 to 370 amps. at 4.2 volts.

Lock Torque—26 pound-feet, 650 amps., 3.5 volts.

Brush Spring Tension—26 to 28 oz. on each.

GENERATOR

Rotation, L. H., Com. End
Owen-Dyneto, Type CD-800

IMPORTANT NOTE—The drive end generator bearing is part of engine. Do not run unit in test bench until special Dyneto bearing is bolted on.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	400	6.5	10	800	7.2
2	450	6.6	16	1000	7.5
5	650	6.8			

Motoring Freely—8 amps. at 6 volts.

Max. Stall Current—28 amps. at 6 volts.

Field Test—4.9 amps. at 6 volts across field coils in series.

Field Fuse—5 amps.

Brush Spring Tension—22 oz. on each.

Third Brush Adjustment—R move cover cap. See Fig. 25, P. 7, Sec. AA.

IGNITION

Rotation, R. H., Top View
North East, Model TEU, Type 10858

IMPORTANT NOTE. This unit uses an eight lobe cam with two sets of breaker arms connected in parallel. They operate simultaneously, and no provision is made for synchronizing.

Breakers—Contact separation .020 inch.

Contact Spring Tension—18-22 oz. on each.

Timing—Set spark in full advanced position 21/32 inch before T. D. C., measured on flywheel. A pointer is located in starter motor hole, and will line up with mark "S" of flywheel in No. 1 firing position.

Spark Plugs—7/8" long (AC type Z-1); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—40 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist R.P.M.	Degrees Advance
800	1-4	400	2.1
1000	4-6	500	2.5
1200	6-8	600	3.4
1600	11-14	800	5.5-7
2000	16-20	1000	8-10
2200	20 (Max)	1100	10

Coil—North East, type 21000.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine.

RELAY

Owen-Dyneto, Type 20058

Closes—6 1/2-7 volts.

Opens—0-2 amps. discharge.

Contact Gap—.015 inch.

Cor Gap—.010 inch, contacts closed.

LIGHTING

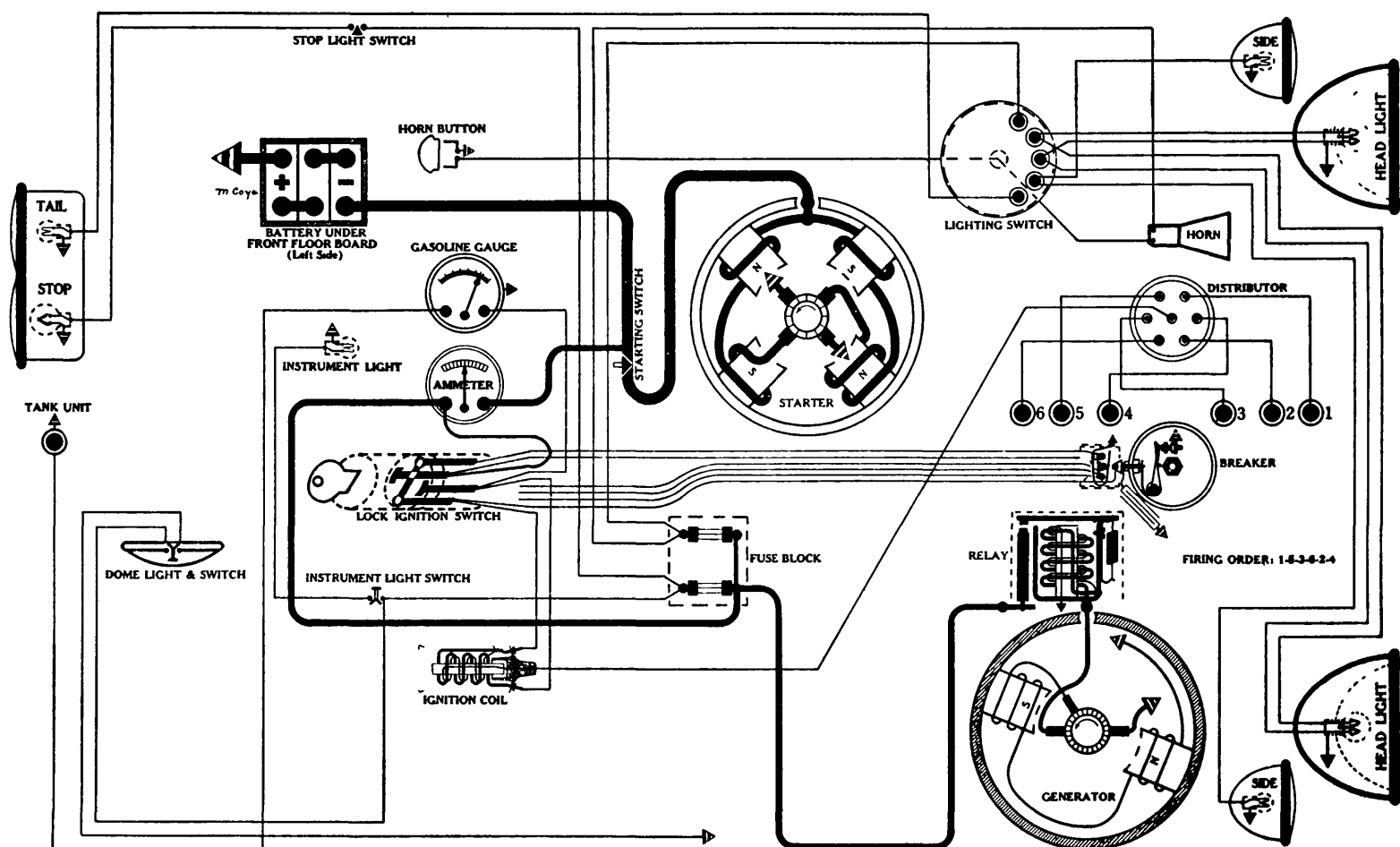
Switch—Delco-Remy, 1317.

Fuses—30 amp. fuse mounted on North East Fuse Block and Resistance Assembly No. 22300.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX.—81, INSTRUMENT—63; DOME—81; TAIL—63; STOP—1129; BACK—1129.

PEERLESS

Model 61, (1929)



BATTERY

U. S. L., 3-HVX-5X-6, 6 volts. Positive terminal grounded
Starting Capacity—106 amps. for 20 minutes.
Lighting Capacity—5 amps for 18 hours.
Box—Length, 9 1/16, width, 7 7/16; height, 9 3/4 inches

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAC-4203

Connection to Engine—Bendix drive.
Running Free—50 amps. at 5.5 volts.
Cranking Engine—120 amps. at 5.4 volts, 120 R. P. M.
Lock Torque—13.5 pound-feet, 540 amps., 3 volts.
Brush Spring Tension—20 to 24 oz. on each.
Starting Switch—Auto-Lite, SW-4002.

IGNITION

Rotation, L. H., Top View
 Auto-Lite, IGB-4023

Break r—Contact separation .020 to .024 inch.
Contact Spring Tension—18-20 oz.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T D C 2—Locate rotor 3—Set spark
 Set spark in full advance position, with pointer over flywheel
 on "Ign" mark.

Spark Plugs—7/8" regular (AC type A); Gap .025 inch

Firing Order—1-5-3-6-2-4.

Manual Advance—28 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	0-2	200	0-1
1200	6-8	600	3-4
2000	14-16	1000	7-8
2800	18-20	1400	9-10

Coil—Auto-Lite, IG-4065.

Ignition Switch—Shaler Lock Switch with round type "Thief Trap." For details of operation and instructions on servicing see Pages 19 and 23, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAL-4110

Performance Data—Gen. cold.

Amps.	R P M	Volts	Amps	R P M.	Volts
0	650	6.5	10	1075	7.3
2	720	6.6	14	1340	7.7
5	850	7	16	1800	8.

Motoring Freely—5-5 1/2 amps at 6 volts.

Max. Stall Current—16-19 amps. at 6 volts.

Field Test—4.7 amps at 6 volts across field coils in series.

Field Fuse—(None).

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7-7.5 volts.

Opens—1/2-2 1/2 amps. discharge.

Contact Gap—.025-.035 inch.

Core Gap—.010-.030 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold No. 2900-A.

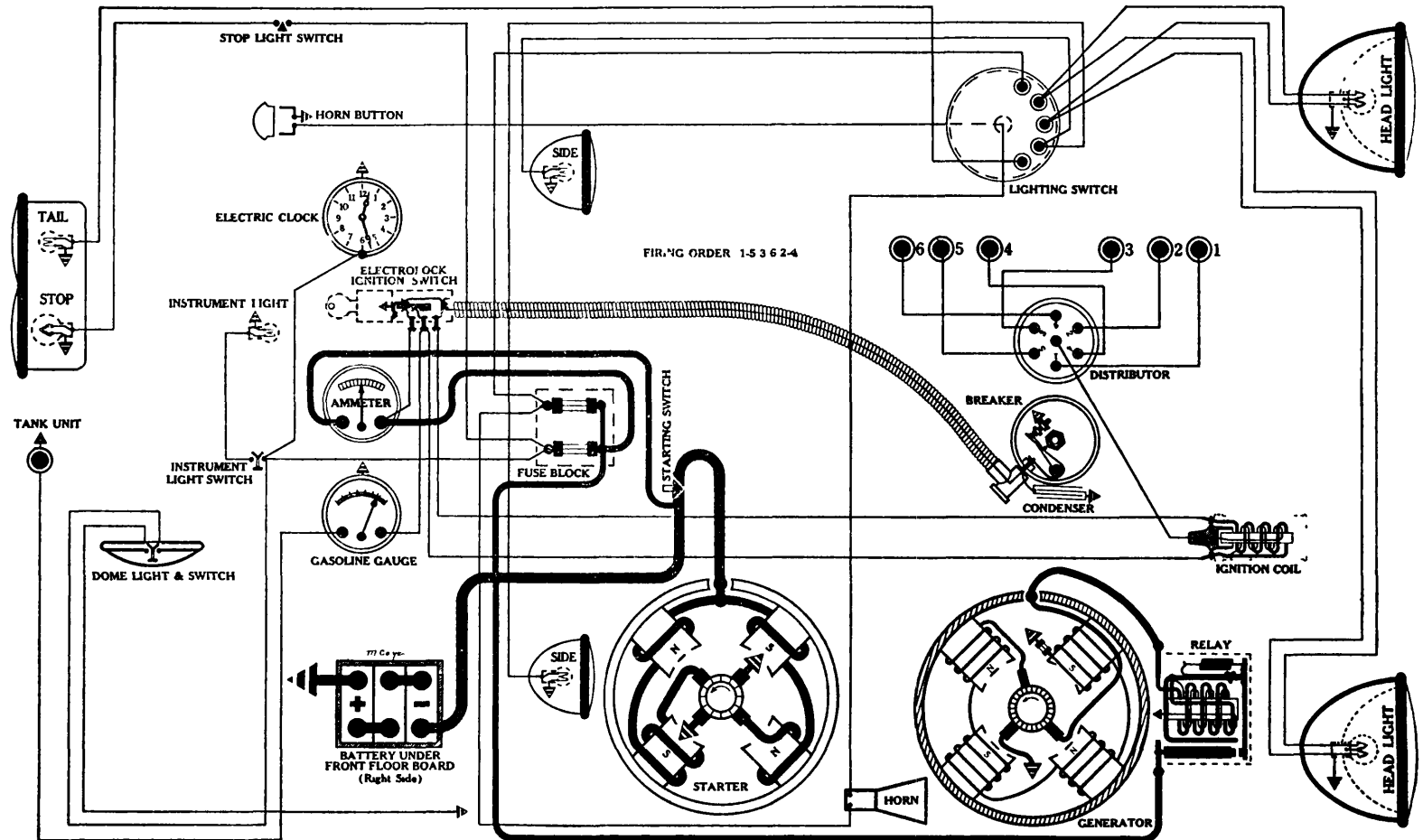
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two 20 amp. fuses mounted on dash (driver's side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; TAIL—63; STOP—87.

PEERLESS

Model 81, (1929)



BATTERY

U. S. L., XY-15-X-6, 6 volts. Positive terminal grounded
 Starting Capacity—119 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 21 hours.
 Box—Length, 10 7/16; width, 7 1/4; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAD-4104

Connection to Engine—Bendix drive.
 Running Free—50 amps. at 5.5 volts.
 Cranking Engine—160 amps. at 5.25 volts, 228 R. P. M.
 Lock Torque—13.6 pound-feet, 540 amps., 3 volts.
 Brush Spring Tension—20 to 24 oz. on each.
 Starting Switch—Auto-Lite, SW-4002.

IGNITION

Rotation, R. H., Top View
 Auto-Lite, IGB-4106-A

Breaker—Contact separation .020 to .024 inch.
 Contact Spring Tension—18-20 oz.
 Timing—See detailed instructions P. 1, Sec. AA.
 1—Locate T. D. C. 2—Locate rotor. 3—Set spark.
 Spark Plugs—Regular Metric (AC type G); Gap .025 inch.
 Firing Order—1-5-3-6-2-4.
 Manual Advance—28 degrees (on Flywheel).
 Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	0-2	200	0-1
1200	6-8	600	3-4
2000	14-16	1000	7-8
2800	18-20	1400	9-10

Coil—Auto-Lite, IG-4066.

Ignition Switch—"Electrolock", type B. For theory of operation and instructions on servicing, see P. 18, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAG-4114

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0	525	6.5
2	550	6.6
5	650	7.
10	780	7.3
14	1200	7.7
17	1250	8.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—17-19 amps. at 6 volts.

Field Test—4.3 amps. at 6 volts across field coils in series.

Field Fuse—5 amps.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4007

Closes—7-7.5 volts.

Opens—1/2-2 1/2 amps. discharge.

Contact Gap—.025-.035 inch.

Core Gap—.010-.030 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold No. 2900-A.

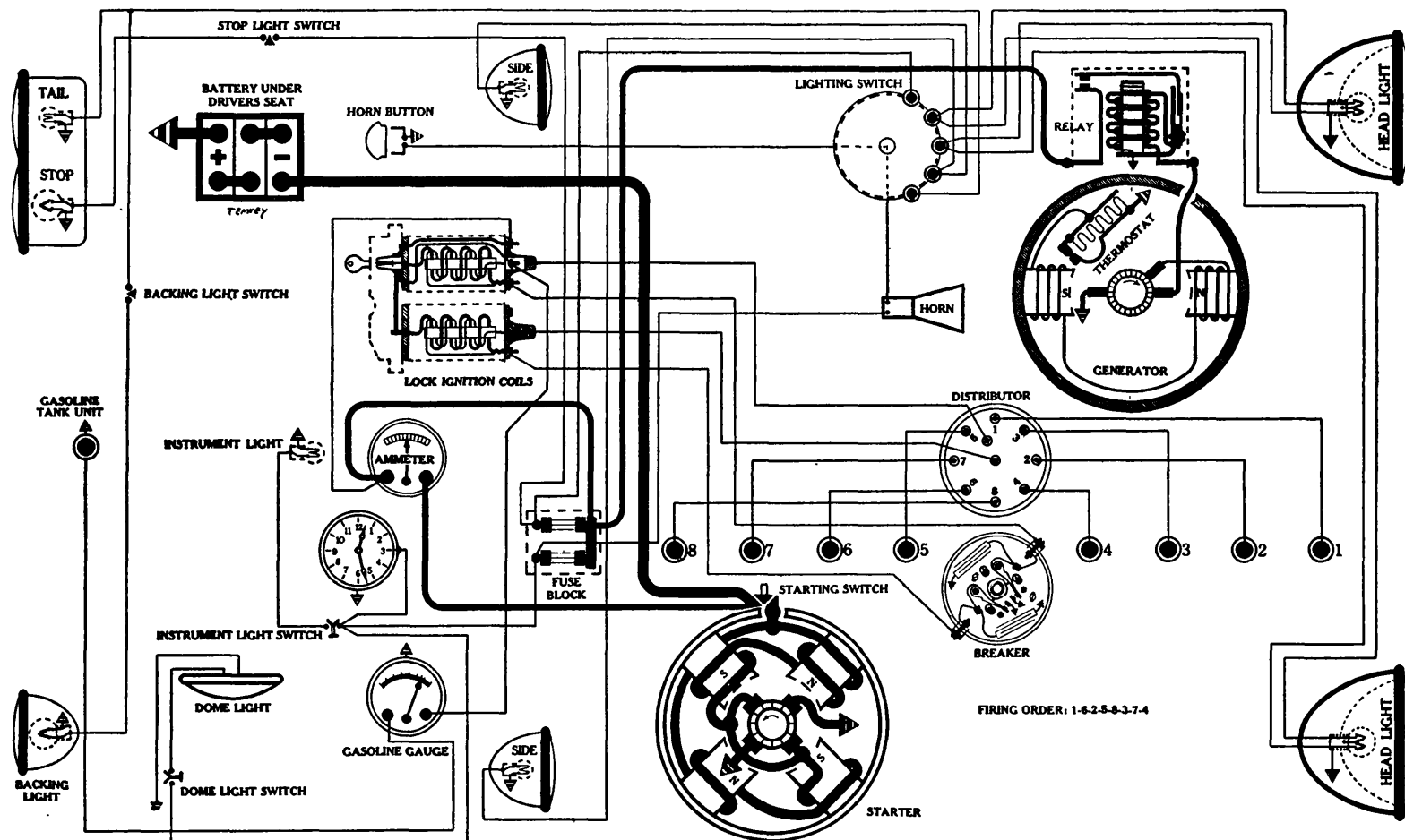
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two 20 amp. fuses mounted on dash (driver's side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; TAIL—63; STOP—87.

PEERLESS

Model 125, Straight Eight, (1929)



BATTERY

Exide, 3XC-19-1S, 6 volts. Positive Terminal Grounded
 Starting Capacity—164 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 30 hours.
 Box—Length, 12 $\frac{3}{8}$; width, 7 $\frac{5}{32}$; height, 9 $\frac{3}{16}$ inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 725-G

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R. P. M.

Cranking Engine—165-185 amps. at 4.2 volts.

Lock Torque—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 668-D

IMPORTANT NOTE: This unit uses a 4-lobe cam, two independent breaker arms, and two coils. The arms must be accurately synchronized to operate at intervals of 45 degrees of distributor travel; corresponding to 90 degrees on flywheel. An eccentric adjusting screw is provided which moves one breaker assembly. Adjust by using Delco-Remy synchronizing tool #18035009 or rotary spark gap on test bench. See detailed instructions P. 26, Sec. AA.

Breakers—Contact separation .022 inch.

Contact Spring Tension—17 to 21 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—Semi-Metric "Aircraft" (AC type N-1); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—19 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0-2	300	0-1
1000	4	500	2
1500	8	750	4
2500	14	1250	7
3200	19	1600	9.5

Coils—Delco-Remy Lock Coils 553-C.

NOTE: This unit is a combined ignition switch and coils. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, R. H., Com. End
 Deico-Remy, 245-U

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts
0.....	500.....	6.5
4.....	700.....	7.
8.....	800.....	7.2
12.....	1000.....	7.8
16.....	1200.....	8.
19.....	1300 (Max.).....	8.3

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5 $\frac{1}{2}$ amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 $\frac{1}{2}$ to 5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7 $\frac{1}{2}$ volts.

Opens—0-2 $\frac{1}{2}$ amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold No. 2900-A.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two 20 amp. fuses mounted on dash (driver's side).

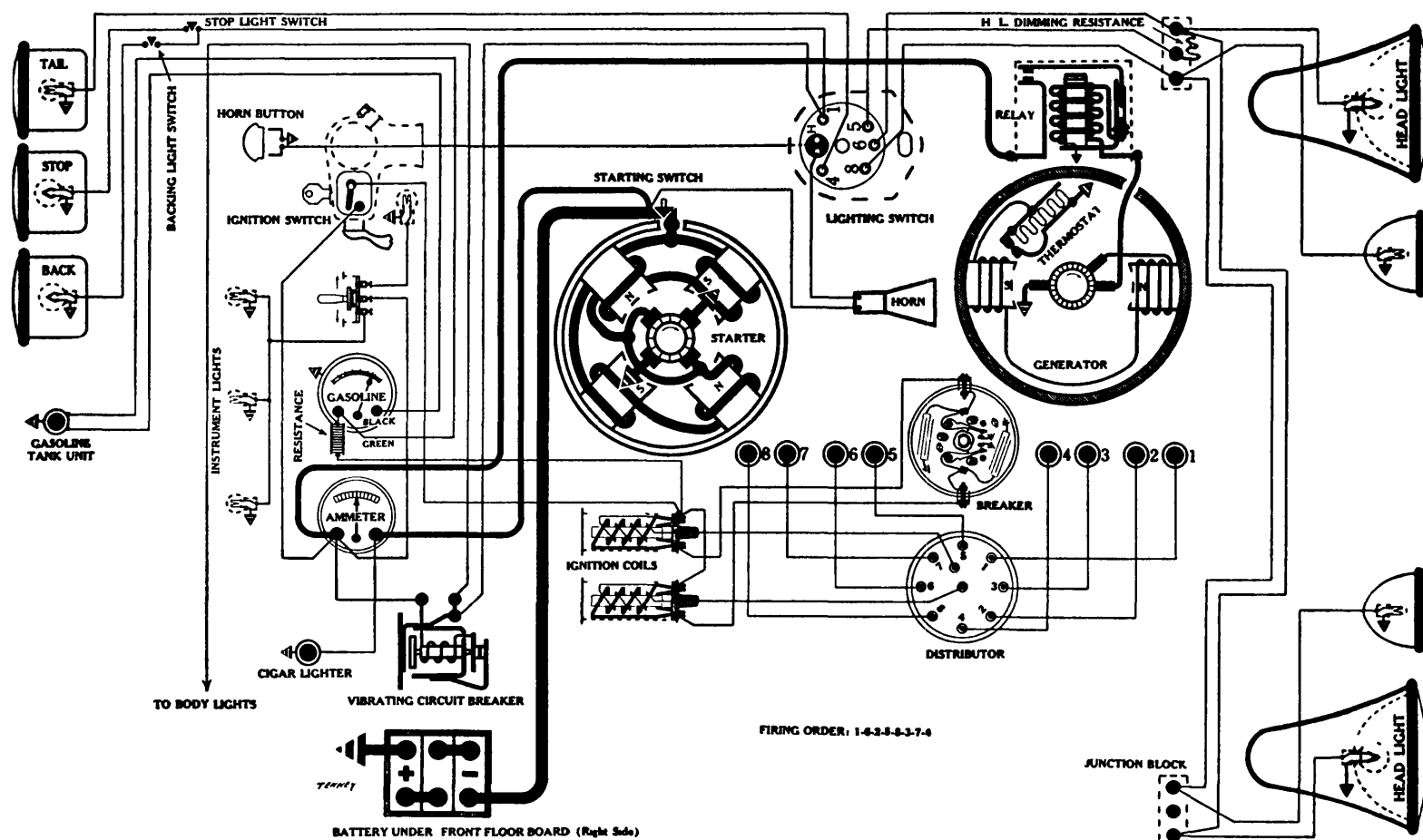
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE

—63; INSTRUMENT—63; DOME—63; TAIL—63;

STOP—87; BACK—1129.

PIERCE-ARROW

Models 133 and 140, (1929)



BATTERY

U. S. L., 3-HVX-6X-6, 6 volts. Positive Terminal Grounded
 Starting Capacity—127 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 23½ hours.
 Box—Length 10 7/16; width, 7; height, 9¾ inches

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 728-C

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on starter. This is a gear reduction job, a pinion being cut on the armature shaft.

Running Free—70 amps. at 5 volts, 2500 R. P. M.

Cranking Engine—150 to 160 amps. at 4.4 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Mounted on starter.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 668-E

IMPORTANT NOTE This unit uses a 4 lobe cam, two independent breaker arms and two coils. The arms must be accurately synchronized to operate at intervals of 45 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw is provided, which moves one breaker assembly. Adjust by using Delco-Remy Synchronizing Tool No. 18035009 or rotary spark gap on test bench. See detailed instructions P. 26, Sec. AA.

Breakers—Contact separation .022 inch.

Contact Spring Tension—17 to 21 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—⅞" regular (AC type A); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—19 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist R.P.M.	Degrees Advance (on cam)
600	0-2	300	0-1
1000	4	500	2
1500	8	750	4
2500	14	1250	7
3200	19	1600	9½

Coils—Delco-Remy, 528-E.

Ignition Switch—Hershey "Coincidental" — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, R. H., Com. End
 Delco-Remy, 955-P

Performance Data—Gen. cold. Thermostat closed.

Amps	R.P.M.	Volts	Amps	R.P.M.	V. Its
0	575	6.5	15	1200	.8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	.8.3
11	1000	7.9			

NOTE Thermostat opens about 165° F., reducing charging rate approx 30-40%.

Motoring Freely—5-5½ amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4¾ to 5½ amps. at 6 volts across field coils in series.

Field Test—4.75-5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. S Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-G

Closes—7-7½ volts.

Opens—0-2½ amps. discharge.

Contact Gap—.015-.025 inch

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-D.

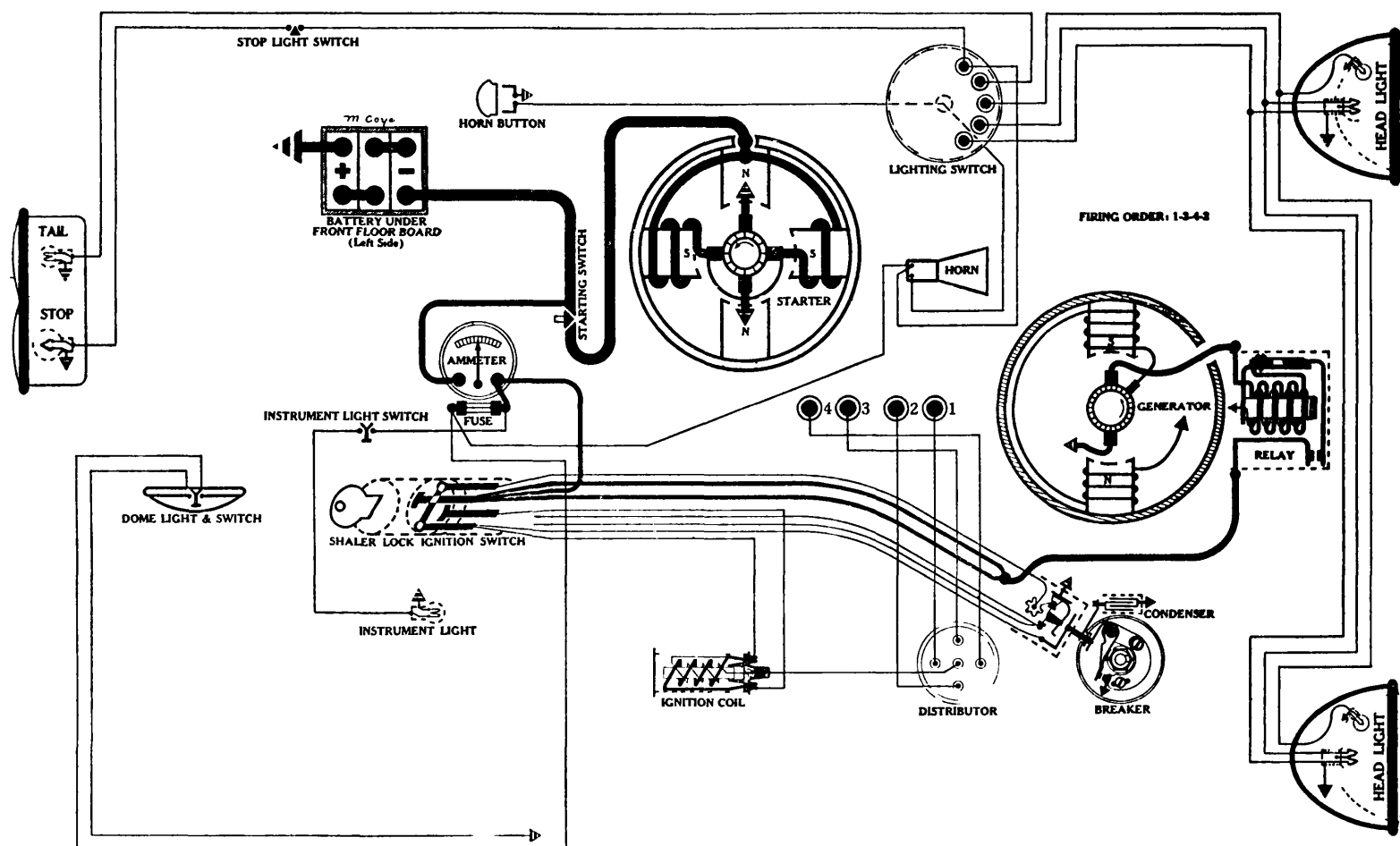
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25-30 amps. Operates 10-15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1129; AUX.—81; DASH—63; DOME—87; TONNEAU—81; BACK—1129; STOP—1129; TAIL—81.

PLYMOUTH

Model 55, (1929)



BATTERY

Willard, WSB-13, 6 volts. Positive Terminal Grounded
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17 hours.
Box—Length, 9 1/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-J

Connection to Engine—Bendix drive.
Running Free—65 amps at 5 volts, 5000 R. P. M
Cranking Engine—175-180 amps at 4.5 volts
Lock Torque—12 pound-feet, 475 amps, 3.6 volts
Brush Spring Tension—24-28 oz. on each.
Starting Switch—Delco-Remy, 404-X or 404-Z.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 630-B

Breaker—Contact separation .018 to .022 inch
Contact Spring Tension—17 to 21 oz.
Timing—See detailed instructions P. 1, Sec. AA
1—Locate T D C. 2—Locate rotor 3—Set spark
Spark Plugs—"Silver Dome" motor—7/8" regular (AC type
A); Gap .027 inch. "Red Head" motor—7/8" semi-
aircraft (AC type Y); Gap .027 inch.

Firing Order—1-3-4-2

Manual Advance—22 degrees (on Flywheel)

Automatic Advance—20 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
600	0 2	300	0 1
800	4	400	2
1200	8	600	4
1800	14	900	7
2400	20	1200	10

Coil—Delco-Remy, 525-E.

Ignition Switch—Shaler Lock Switch. For details of operation and instructions on servicing see P. 23, Sec. AA.

GENERATOR

Rotation, L. H., Com. End (Belt Drive)
Delco-Remy, 947-B

Performance Data—Gen. cold. No thermostat.

Amps	RPM	Volts
0	725	6.5
3	900	7.
8	1175	7.3
12	1400	7.7
14	1600	7.9
16	1800 (Max.)	8
15	2200	8.

Motoring Freely—4 1/2-5 1/2 amps. at 6 volts.

Max. Stall Current—15-18 amps. at 6 volts.

Field Test—4 to 4 1/2 amps. at 6 volts, across field coils in series.

Brush Spring Tension—24-28 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7 1/2 volts.

Opens—0-2 1/2 amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Clum 10738.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

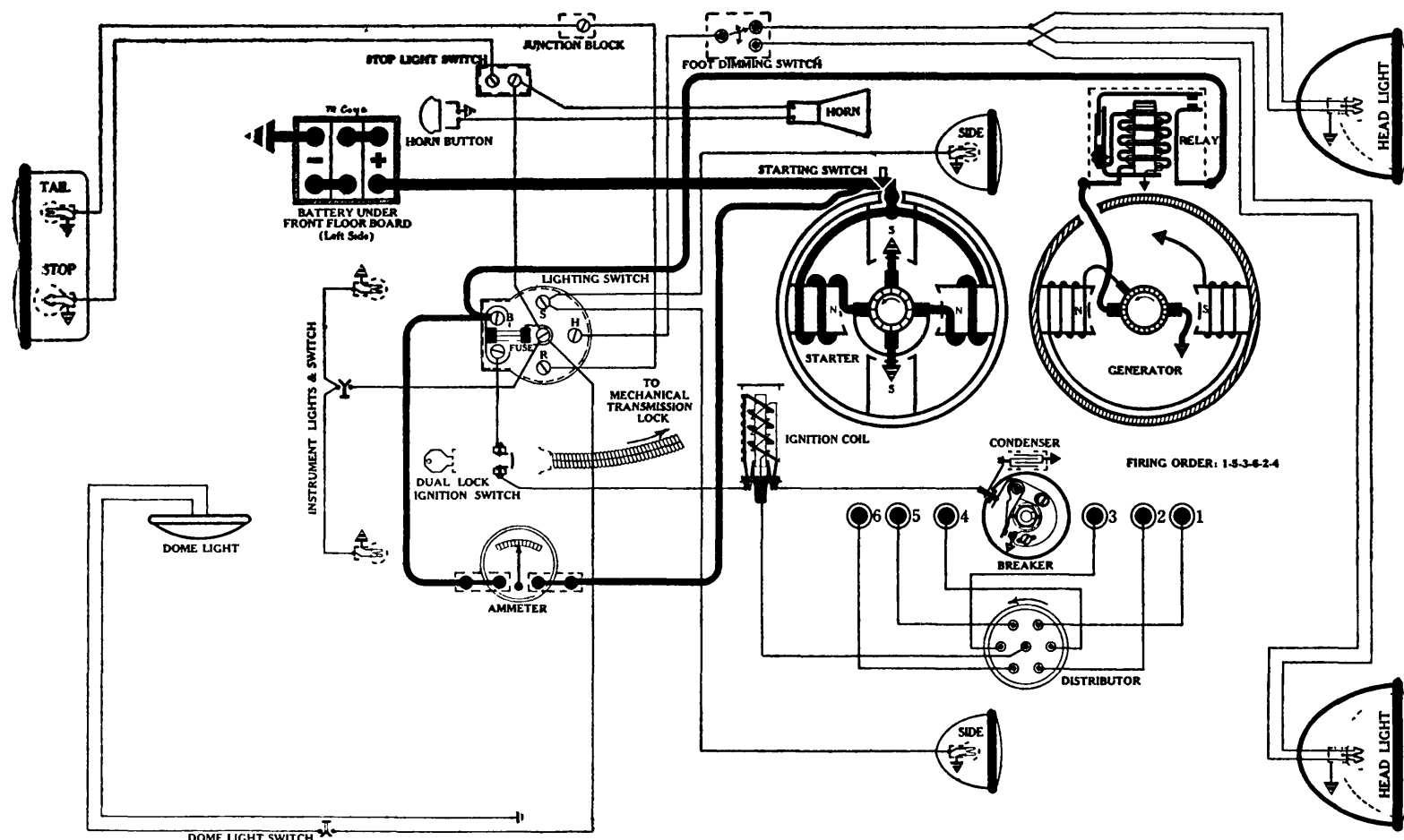
Fuses—Single 20 amp. fus. mounted behind instrument board (below ammeter).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX—63; INSTRUMENT—63; DOME—63; (If two socket Tail Light) STOP—87; TAIL—63; (If single socket Tail Light) STOP AND TAIL—1158.

NOTE This is the old style Ford head light bulb with two filaments, make sure the 3 C P filament burns for tail light.

PONTIAC

Mod 1, Big Six, (1929)



BATTERY

Willard, WSB-13, 6 volts. Negative Terminal Grounded
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17 hours.
Box—Length, 9 1/16; width, 7 1/16; height, 9 1/4 inches
Prest-O-Lite, 6-13-J also used. For data see Chandler, Model 65, 1929.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-F

Connection to Engine—Bendix drive.
Running Free—65 amps. at 5 volts, 5000 R. P. M.
Cranking Engine—175-180 amps. at 4.5 volts.
Lock Torque—12 pound-feet, 475 amps., 3.6 volts.
Brush Spring Tension—24-28 oz. on each
Starting Switch—Mounted on starter.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 639-U

(Full Automatic Spark Advance)

Breaker—Contact separation .018 to .024 inch.
Contact Spring Tension—17 to 21 oz.
Timing—See detailed instructions P. 1, Sec. AA
1—Locate T. D. C. 2—Locate rotor. 3—Set spark
Spark Plugs—7/8" long (AC type B); Gap .022 inch.
Firing Order—1-5-3-6-2-4.
Manual Advance—(None).
Automatic Advance—24 1/2 degrees (on Flywheel).

Eng R P M	Degrees Advance (on flywheel)	Dist R P M	Degrees Advance (on cam)
600	0-2	300	0-1
1000	8	500	4
1500	14	750	7
2000	18	1000	9
2600	24 1/2	1300	12 1/4

Coil—Delco-Remy, 528-C.

Ignition Switch—Delco-Remy, 425-L, "Dual Lock". (Combination ignition switch and mechanical transmission lock).

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 943-J

Performance Data—Gen. cold. No thermostat.

Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	575	6.5	14	1400	7.9
5	800	7.1	16	1600	8.
9	1000	7.5	18	1700 (Max.)	8.2
12	1200	7.8			

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—17 to 19 amps. at 6 volts.

Field Test—4 1/2 to 5 amps. at 6 volts, across field coils in series.

Brush Spring Tension—16-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7-7 1/2 volts.

Opens—0-2 1/2 amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Clum No. 10741.

Location—Behind instrument board. Operated by pull knob.

Fuse—Single 20 amp. fuse mounted on switch back.

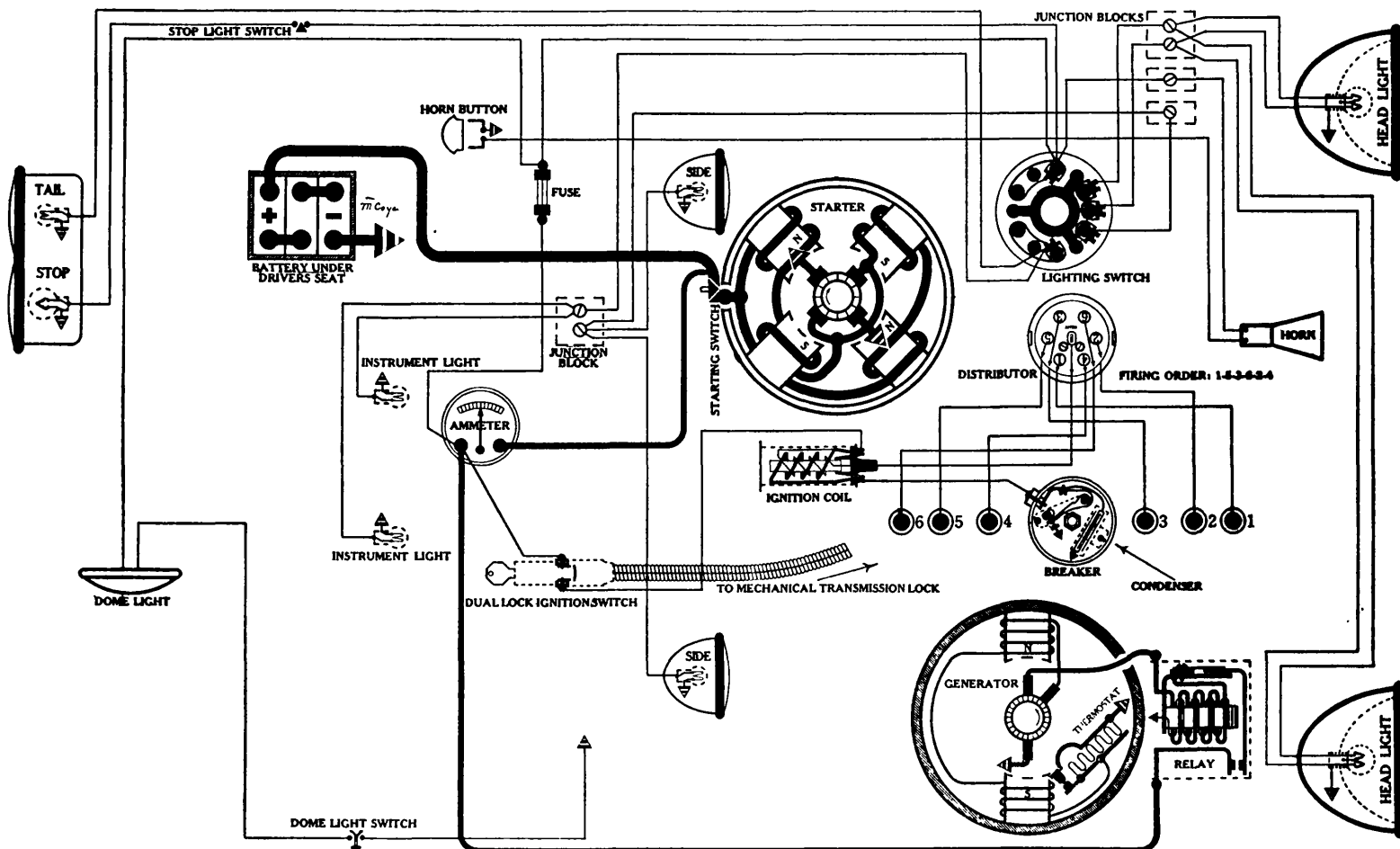
Foot Dimming Switch—Delco-Remy, 465-B.

Location—On toe board (left side). Tilt beam controlled by pressing plunger by foot.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; STOP—87; TAIL—63.

REO

Mod 1 "C" Flying Cloud-Master, (1929)
Mod 1 20, (1930)



BATTERY

Willard, SJRR-4, 6 volts. Negative Terminal Grounded
Starting Capacity—125 amps. for 20 minutes.
Lighting Capacity—5 amps. for 22 hours.
Box—Length, 10 5/16; width, 7 1/16; height, 9 3/4 inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 724-M; 724-V

Connection to Engine—Mechanical Gear Shift incorporating dis clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch n starter. This is a gear reduction job, a pinion being cut on th armature shaft.

Running Free—70 amps. at 5 volts, 3500 R. P. M.
Cranking Engine—150-170 amps. at 4.6 volts.
Lock Torque—22 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—28-32 oz. on each.
Starting Switch—Mounted on starter.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 640-G

Breaker—Contact separation .018 to .024 inch.
Contact Spring Tension—17-21 oz.
Timing—See d tailed instructions P. 1, Sec. AA.
1—Locate T. D. C. 2—Locate rotor. 3—Set spark.
Spark Plugs—R gular Metric (AC type G); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Manual Advance—25 degrees (on Flywheel).
Automatic Advance—20 degrees (on Flywheel).
Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance
(on flywheel) (on cam)
900..... 0-2..... 450..... 0-1
1500..... 8..... 750..... 4
2200..... 16..... 1100..... 8
3000..... 22..... 1500..... 11
Coil—Delco-Remy, 528-E.

Ignition Switch—Delco-Remy, 425-C, "Dual Lock". (Combination ignition switch and mechanical transmission lock).

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-G

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0.....	575.....	6.5	15.....	1200.....	8.1
3.....	700.....	7.	20.....	1450 (Max.)	8.3
6.....	800.....	7.1	19.....	1700.....	8.3
11.....	1000.....	7.9			

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—16-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7 1/2 volts.

Opens—0-2 1/2 amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 482-F.

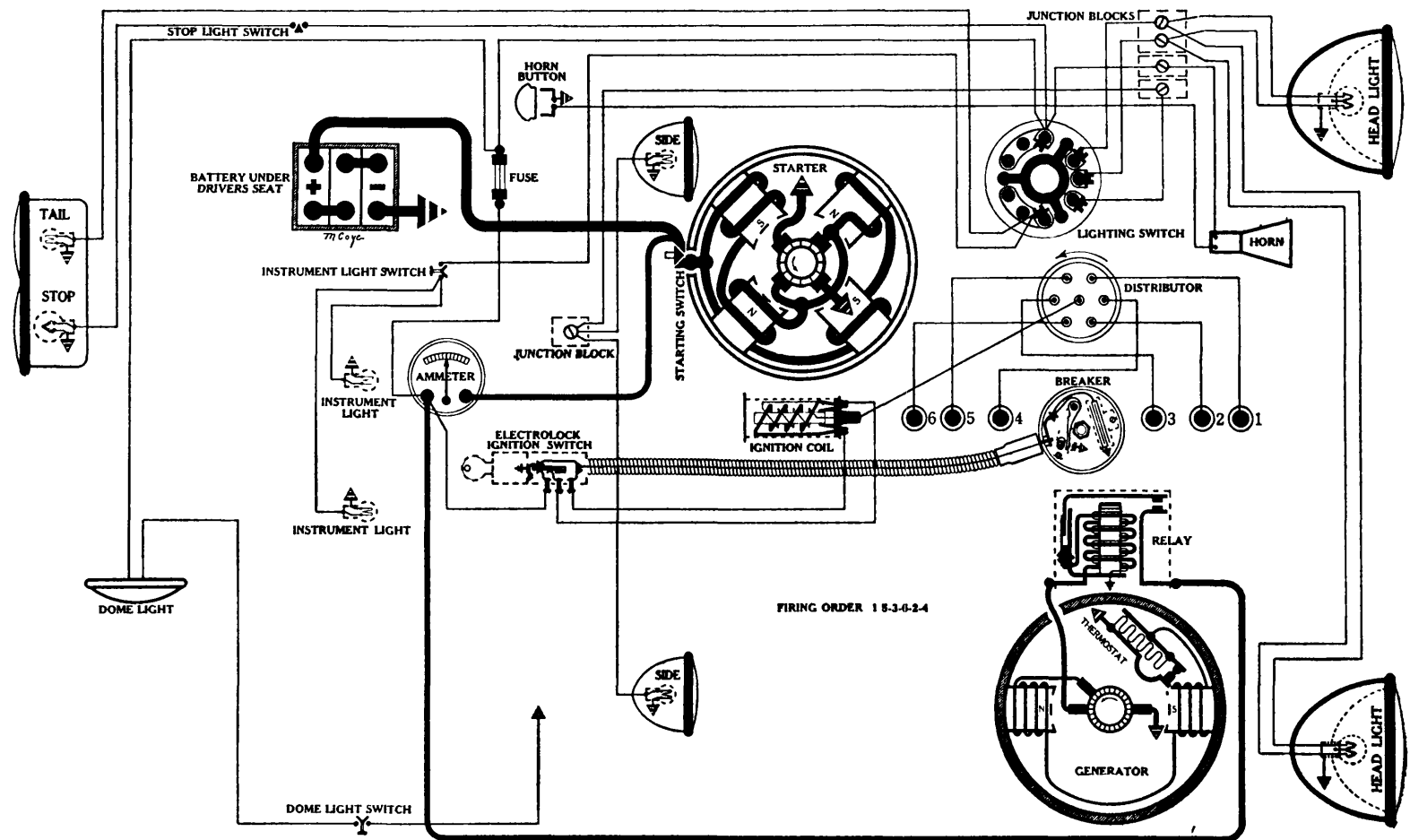
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse mounted on block, driver's side dash.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; TAIL—63; STOP—87.

REO

Model "D-2" Flying Cloud-Mate, (1929)
Model 15, (1930)



BATTERY

Willard, RSB-13, 6 volts. Negative Terminal Grounded
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17 hours.
Box—Length, 9 1/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 726-E

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R. P. M.
Cranking Engine—165-185 amps. at 4.2 volts.
Lock Torque—16 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 641-D

Breaker—Contact separation .018 to .024 inch.
Contact Spring Tension—17-21 oz.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—Regular Metric (AC type G); Gap .025 inch.
Firing Order—1-5-3-6-2-4.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
900	0-2	450	0-1
1500	8	750	4
2200	16	1100	8
3000	22	1500	11

Coil—Delco-Remy, 528-E.

Ignition Switch—"Electrolock", type B. For details of operation and instructions on servicing, see P. 18, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-L

Performance Data—Gen. cold. Thermostat closed.		
Amps.	R.P.M.	Volts
0	575	6.5
3	700	7.
6	800	7.1
11	1000	7.9

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—16-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7 1/2 volts.

Opens—0-2 1/2 amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 482-F.

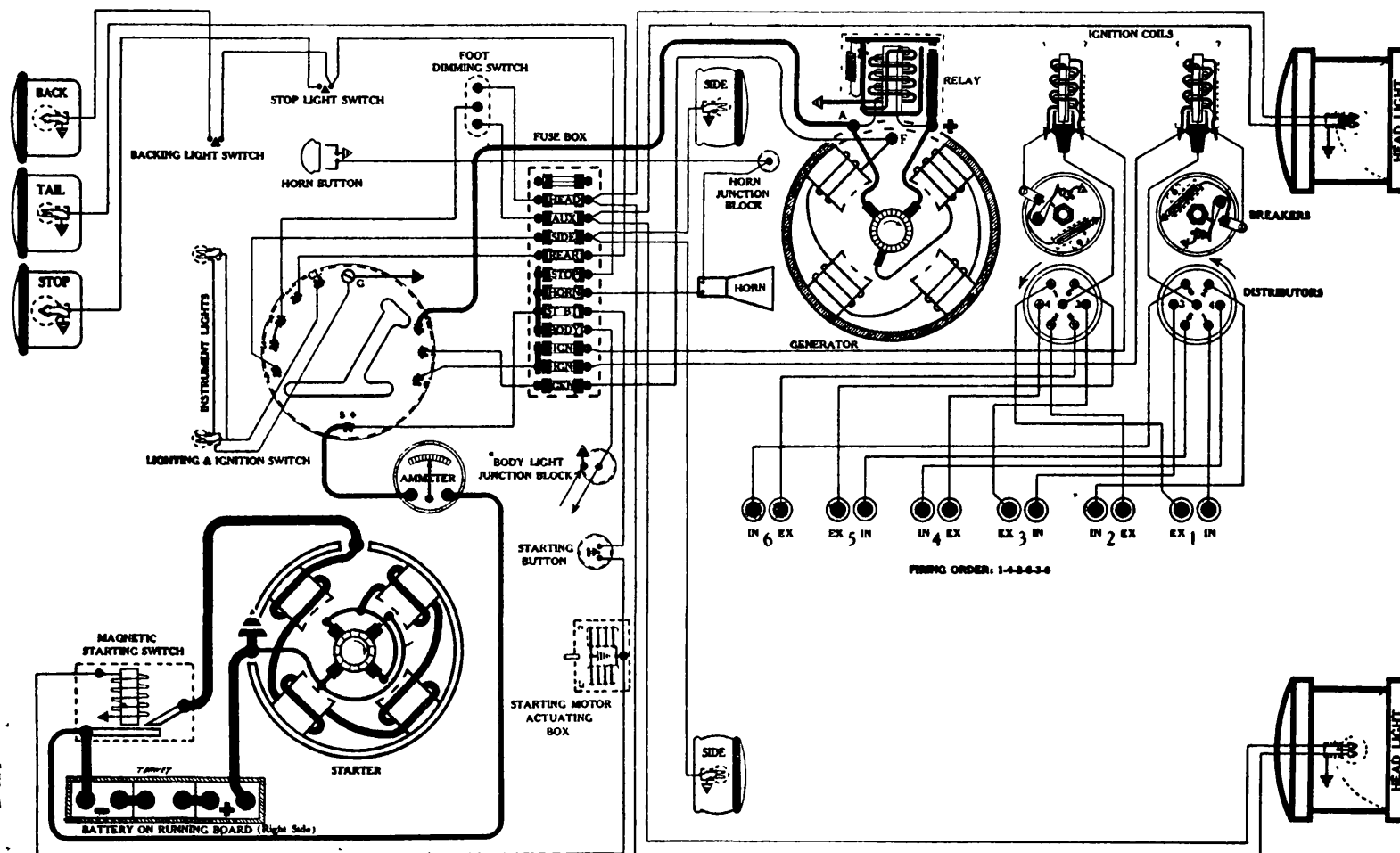
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse mounted on block, driver's side dash.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; TAIL—63; STOP—87.

ROLLS-ROYCE

Model Phantom, (1929-30)



BATTERY

Exid , 3-XCRV-21-2G, 6 volts. Positive Terminal Grounded

Starting Capacity—164 amps. for 20 minutes.

Lighting Capacity—5 amps. for 30 hours

Box—Length, 20 7/16; width, 5 1/2; height, 8 3/4 inches.

STARTER

Rotation, R. H., Com. End

Rolls-Royce (Own Make)

CONNECTION TO ENGINE—Chain drive thru special friction clutch (to protect starter in case of back fire), to inner shaft in hollow transmission "Side Shaft", thru jaw clutch (meshed by magnetic action of actuating box) to transmission, thru fly-wheel clutch to engine. Operation of push button switch on dash magnetizes the main starter switch and actuating box which are both connected in parallel.

Running Free—70 amps., 5000 R. P. M., 5.5 volts.

Lock Torque—31 pound-feet, 800 amps., 4 volts.

Brush Spring Tension—16 oz on each.

IGNITION

Rotation, L. H., Top View

De' Jon, IAA-4004

Breakers—Contact separation .018 to .020 inch on each.

Contact Arm Spring Tension—18 to 20 oz. on each

Timing—Both sets of breaker points should open when line on flywheel, marked "L. I.", is opposite line on the case. Synchronize points by use of ammeter, following same general instructions as explained under "Twin Ignition", see P. 24, Sec. AA

Spark Plugs—Regular Metric (AC type G); Gap .030 inch.

Firing Order—1-4-2-6-3-5.

Manual Advance—18 degrees (on Flywheel).

Automatic Advance—32 degrees (on Flywheel).

Eng R P M	Degrees Advance (on flywheel)	Dist R P M.	Degrees Advance (on cam)
400	0	200	0
800	5	400	2.5
2000	21	1000	10.5
2800	31	1400	15.5

Coils—De' Jon, CAA-4002.

GENERATOR

Rotation, R. H., Com. End

Rolls-Royce (Own Make)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0	425	6.5
2	500	6.6
5	725	7.
10	1000	7.5
16	1275 (Max.)	7.9

Motoring Freely—3 amps. at 6 volts.

Max. Stall Current—24 amps. at 6 volts.

Field Test—2 3/4 amps. at 6 volts across field coils in series.

Brush Spring Tension—12 to 14 oz. on each.

Third Brush Adjustment—Not necessary to loosen cover band. Loosen 4 nuts on generator end frame. Tap ring R. H. to increase rate. Relock.

RELAY

Rolls-Royce (Own Make)

Closes—7 1/2 to 8 volts.

Opens—0 to 1 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.012 to .016 inch, contacts closed.

LIGHTING

Switch—Rolls-Royce (Own Make).

Foot Dimming Switch—Delco-Remy, 465-A.

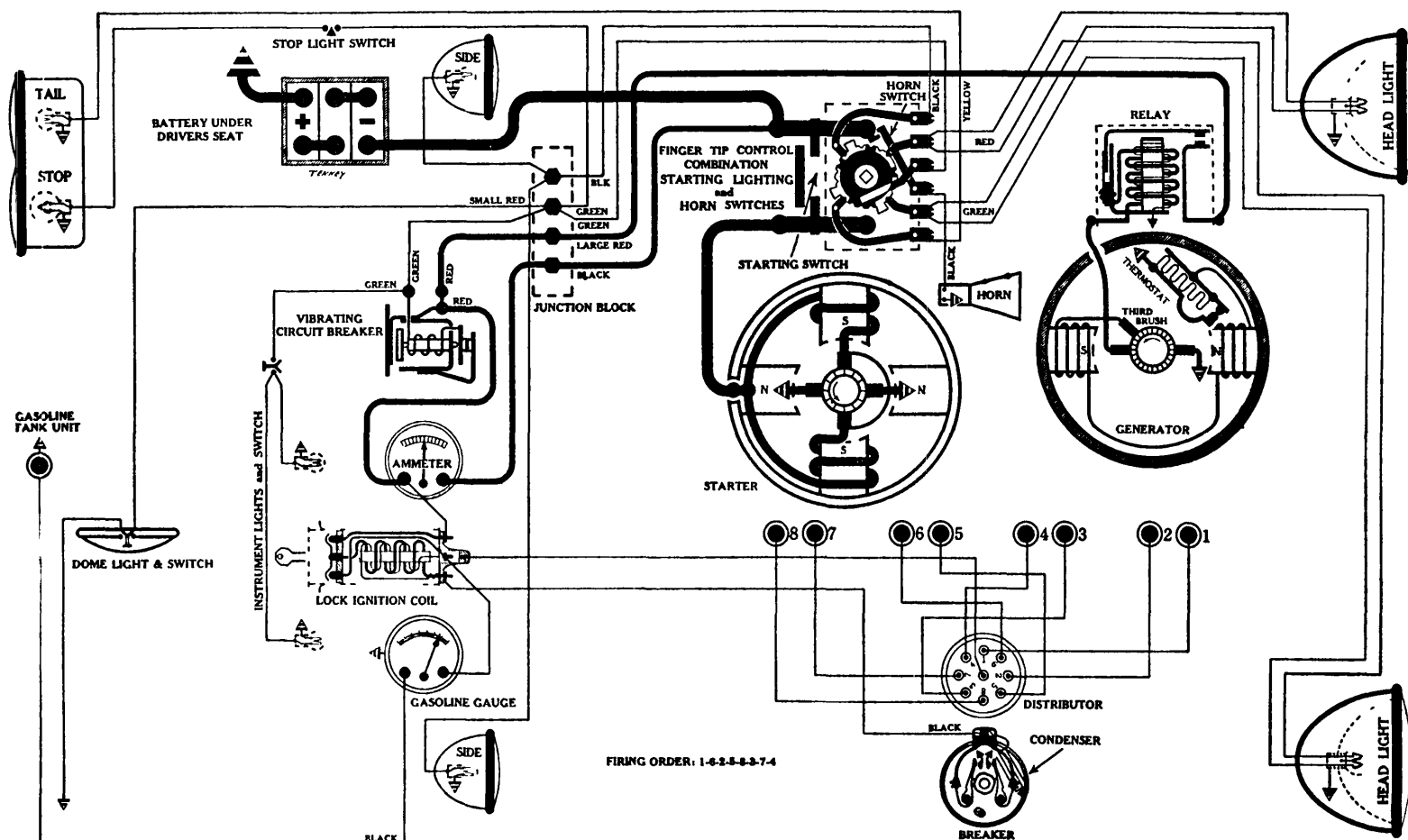
Location—On toe board (1 ft sid). Tilt beam controlled by pressing plunger by foot.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal);

STOP—1129; BACK—1129; SIDE—63; TAIL—63;

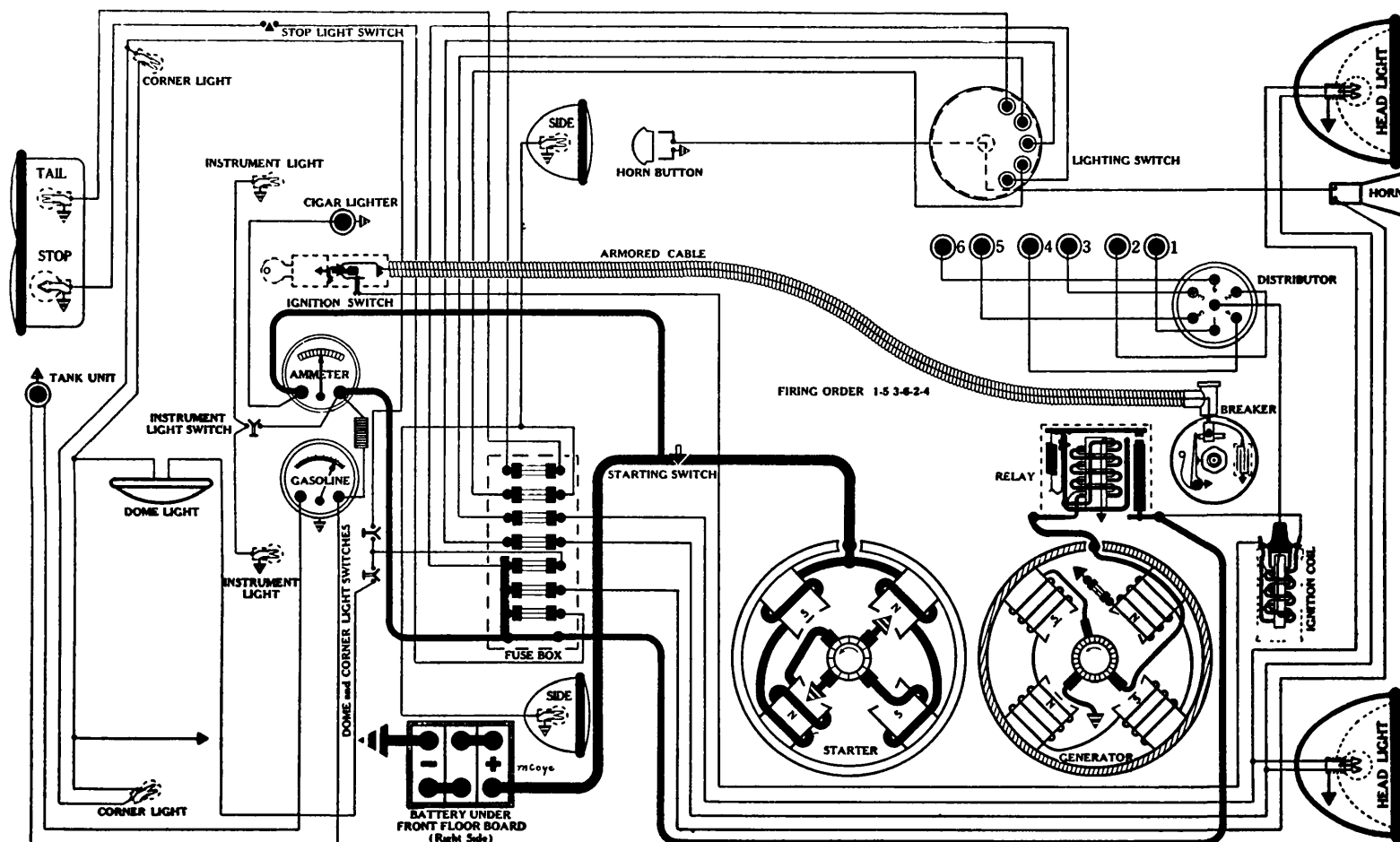
INSTRUMENT—64; BODY—64.

Model, Straight Eight (1929-30)



STEARNS-KNIGHT

Series Eighty, (1929)
Mod I M—126 inch Wheelbase
Model N—134 inch Wheelbase



BATTERY

U. S. L., 3-HVX-8X-4, 6 volts. Negative Terminal Grounded

Starting Capacity—170 amps. for 20 minutes.

Lighting Capacity—5 amps for 33 hours.

Box—Length, 13 1/16; width, 7 7/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4001

Conn ction to Engine—Bendix drive.

Running Free—60 amps. at 6 volts.

Cranking Engine—160-170 amps. at 5 volts.

Lock Torque—17 pound-feet, 520 amps. at 3 volts.

Brush Spring Tension—24-28 oz. on each.

Starting Switch—Auto-Lite, SW-4001.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGA-4035

Breaker—Contact separation .018 to .022 inch.

Contact Arm Spring Tension—18 to 20 oz.

Timing—Set spark 12 degrees before top dead center.
1 31/64 inches measured on Flywheel with spark lever fully advanced.

Spark Plugs—7/8" regular (AC type A), Gap .025 inch.

Firing Ord r—1-5-3-6-2-4.

Manual Advance—22 degrees (on Flywheel)

Automatic Advance—22 degrees (on Flywheel)

Eng R.P.M.	Degrees Advance (on flywheel)	Dist R.P.M.	Degrees Advance (on cam)
450	Start	225	Start
600	1-5	300	5-2-5
1000	5-8-5	500	2-5-4
1400	9-12	700	4-5-6
1800	12-15	900	6-7-5
2200	15-18-5	1100	7-5-9
2400	19-22	1200	9-5-11

Coil—Auto-Lite, IG-4065.

Ignition Switch—"Electrolock", Type A. For theory of operation and instructions on servicing see P. 17, Sec. AA

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GRE-4207

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps	R.P.M.	Volts
0	425	6.5	14	1000	7.9
3	475	7	18	1200 (Max.)	8.3
6	550	7.1	17	1700	8.3
10	650	7.6			

Motoring Freely—4 1/2-5 amps. at 6 volts.

Max. Stall Current—17-19 amps. at 6 volts.

Field Test—2 1 amps. at 6 volts across field coils in series.

Field Fuse—5 amps.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4007

Closes—7-7.5 volts.

Opens—1/2-2 1/2 amps. discharge.

Contact Gap—.025-.035 inch.

Core Gap—.010-.030 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton.

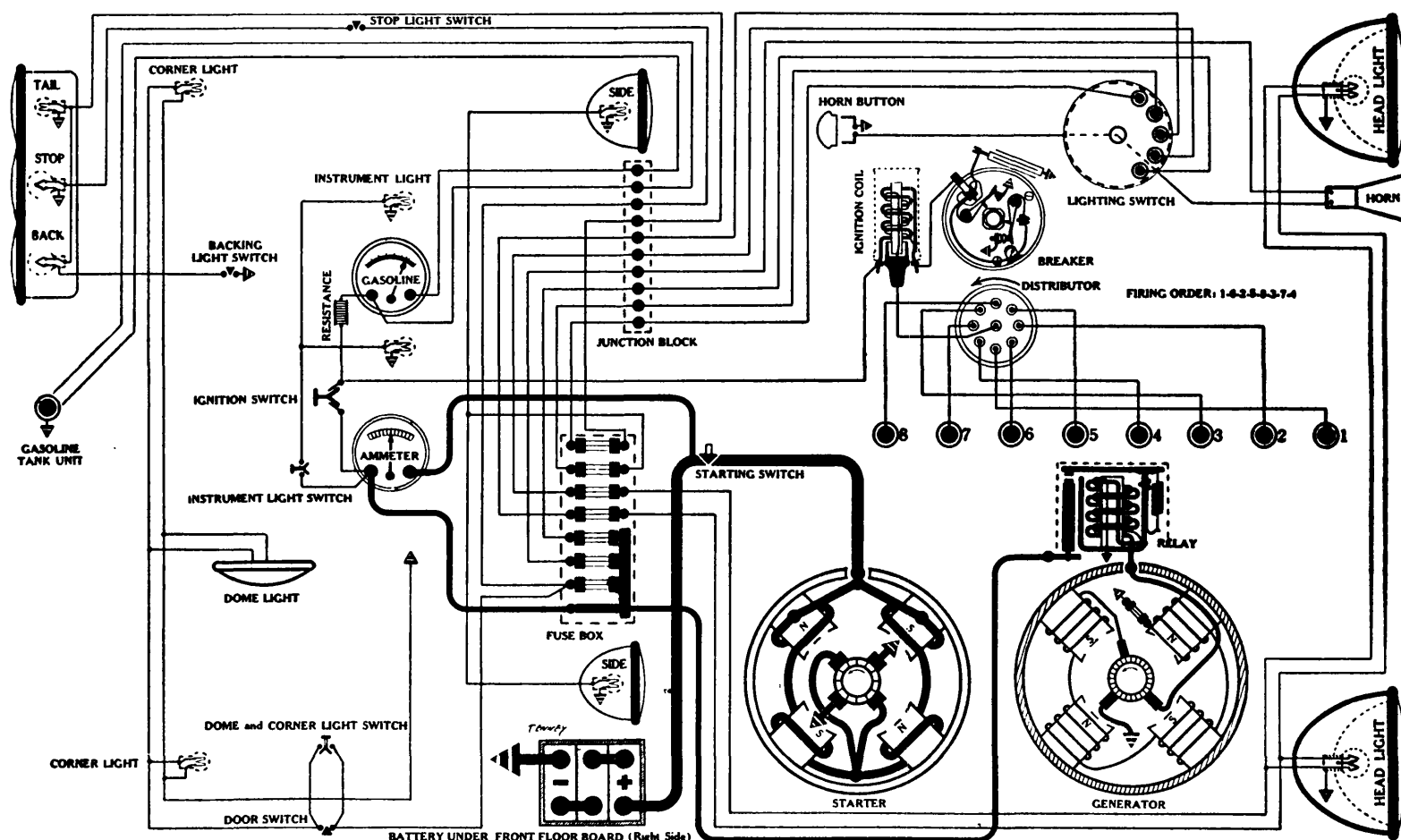
Location—Foot of steering column. Lights controll d by lever on steering wheel.

Fuses—All 20 amp. mounted in fuse box under engine hood (right side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; TAIL—63; STOP—1129; CORNER—63; DOME—63.

STEARNS-KNIGHT

D Luxe Series, (1929)
Mod ls, H-8-90 and J-8-90



BATTERY

U. S. L., 3-CVX-10X, 6 volts. Negative Terminal Grounded
Starting Capacity—192 amps. for 20 minutes.
Lighting Capacity—5 amps. for 38 hours.
Box—Length, 16 $\frac{3}{8}$; width, 7 $\frac{7}{16}$; height, 9 $\frac{3}{8}$ inches.

STARTER

Rotation, L. H., Com. End
De' Jon, SD-4102

Connection to Engine—Bendix drive, type L-11-X-V.
Running Free—70 amps. at 5.8 volts, 1750 R. P. M.
Cranking Engine—270 to 290 amps. at 4.3 volts.
Lock Torque—29 pound-feet, 720 amps. at 3 $\frac{1}{2}$ volts.
Starting Switch—De' Jon, SW-4201.

IGNITION

Rotation, L. H., Top View
De' Jon, IAB-4001

IMPORTANT NOTE: This unit uses a four-lobe cam with two breaker arms connected in parallel. Cam is so designed that one point is open when other is just breaking but closes few degrees after break occurs. The arms must be accurately synchronized to operate at intervals of exactly 46 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw is provided which moves one breaker point assembly. For detailed instructions on synchronizing see P. 22, Sec. AA.

Breakers—Contact separation .018 to .022 inch.

Contact Spring Tension—18-22 oz. on each.

Timing—See detailed instructions, P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—SAE regular (AC type E); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—30 degrees (on Flywheel).

Automatic Advance—31 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	0	200	0
800	5	400	2.5
1200	10.4	600	5.2
1600	16	800	8
2000	21	1000	10.5
2400	26	1200	13
2800	31	1400	15.5

Coil—De' Jon, CA-4023.

Ignition Switch—Soreng Manegold, 1080-A.

GENERATOR

Rotation, L. H., Com. End
De' Jon, DA-4016

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	375	6.5	12	1100	7.8
3	500	7	15	1200 (Max.)	8
6	700	7.1	14	1500	8
10	900	7.6			

Motoring Freely—4-4 $\frac{1}{2}$ amps. at 6 volts.

Max. Stall Current—16-18 amps. at 6 volts.

Field Test—2.5 amps. at 6 volts across field coils in series.

Field Fuse—5 amps.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Not necessary to loosen cover band. See Fig. 18, P. 7, Sec. AA.

RELAY

De' Jon, RA-4001-A, 6 volts

Closes—7-8 volts.

Opens— $\frac{1}{2}$ -2 $\frac{1}{2}$ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.015 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton.

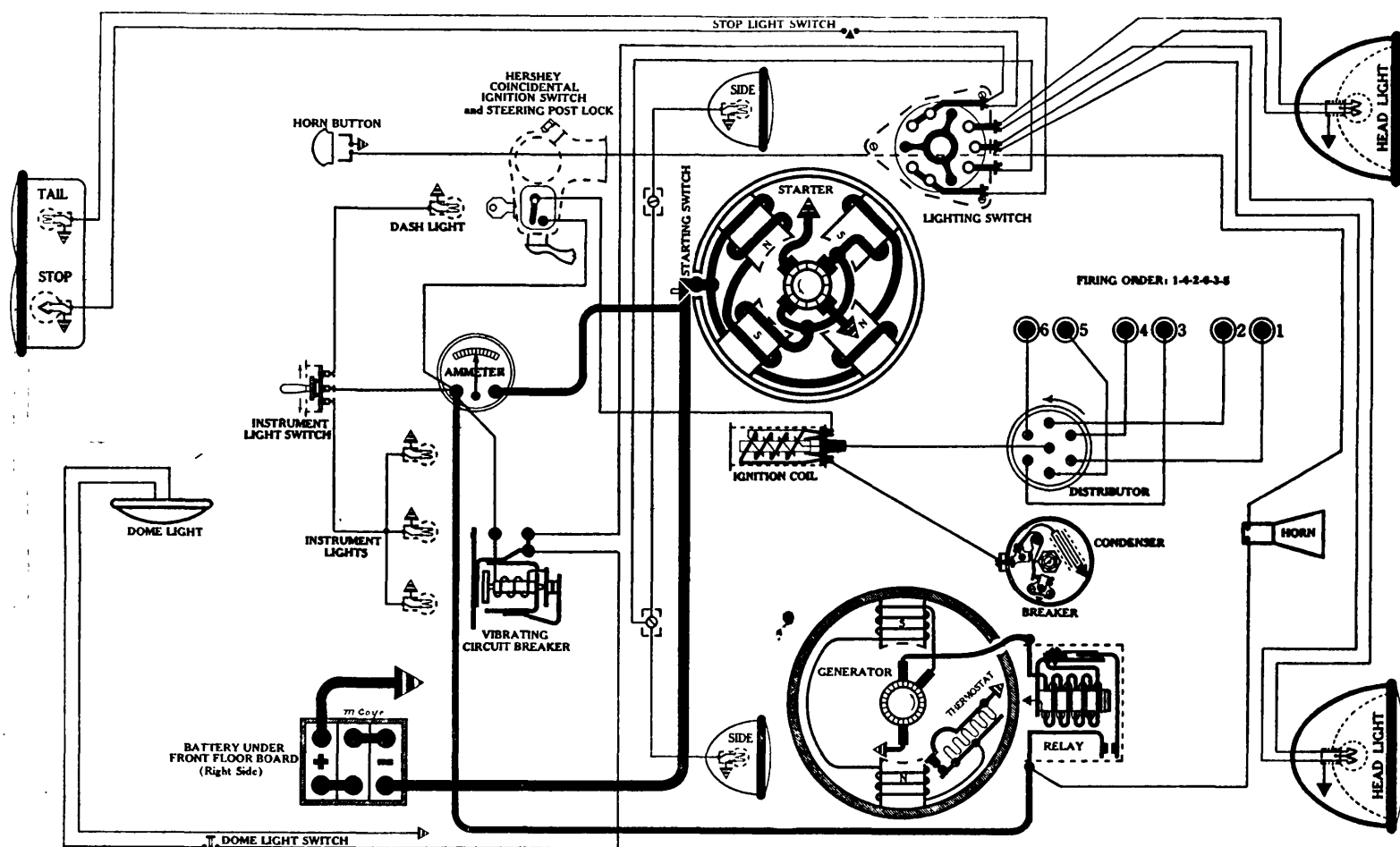
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—All 20 amp. mounted in fuse box under engine hood (right side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; TAIL—63; STOP—1129; CORNER—63; DOME—63.

STUDEBAKER

Model, Commander Six, (1929)



BATTERY

Willard, SJWR-3, 6 volts. Positive Terminal Grounded
Starting Capacity—104 amps. for 20 minutes.
Lighting Capacity—5 amps. for 18 hours.
Box—Length, 9 1/16; width, 7 1/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 726-F

Connection to Engine—Mechanical gear shift, incorporating an overrunning clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter.

Running Free—65 amps. at 5 volts, 6000 R. P. M.

Cranking Engine—185-190 amps. at 4.1 volts.

Lock Torque—15 pound-feet, 570 amps., 3.1 volts.

Brush Spring Tension—24-28 oz. on each.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 636-Y

Breaker—Contact separation .022 inch.

Contact Spring Tension—18-20 oz.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—7/8" long (AC type Z); Gap .025 inch.

Firing Order—1-4-2-6-3-5.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—34 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	0-2	200	0-1
800	8	400	4
1600	18	800	9
2400	26	1200	13
3000	34	1500	17

Coil—Delco-Remy, 528-E.

Ignition Switch—Hershey "Coincidental" — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 949-J

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 80-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 1/2 to 5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7 1/2 volts.

Opens—0-2 1/2 amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-E.

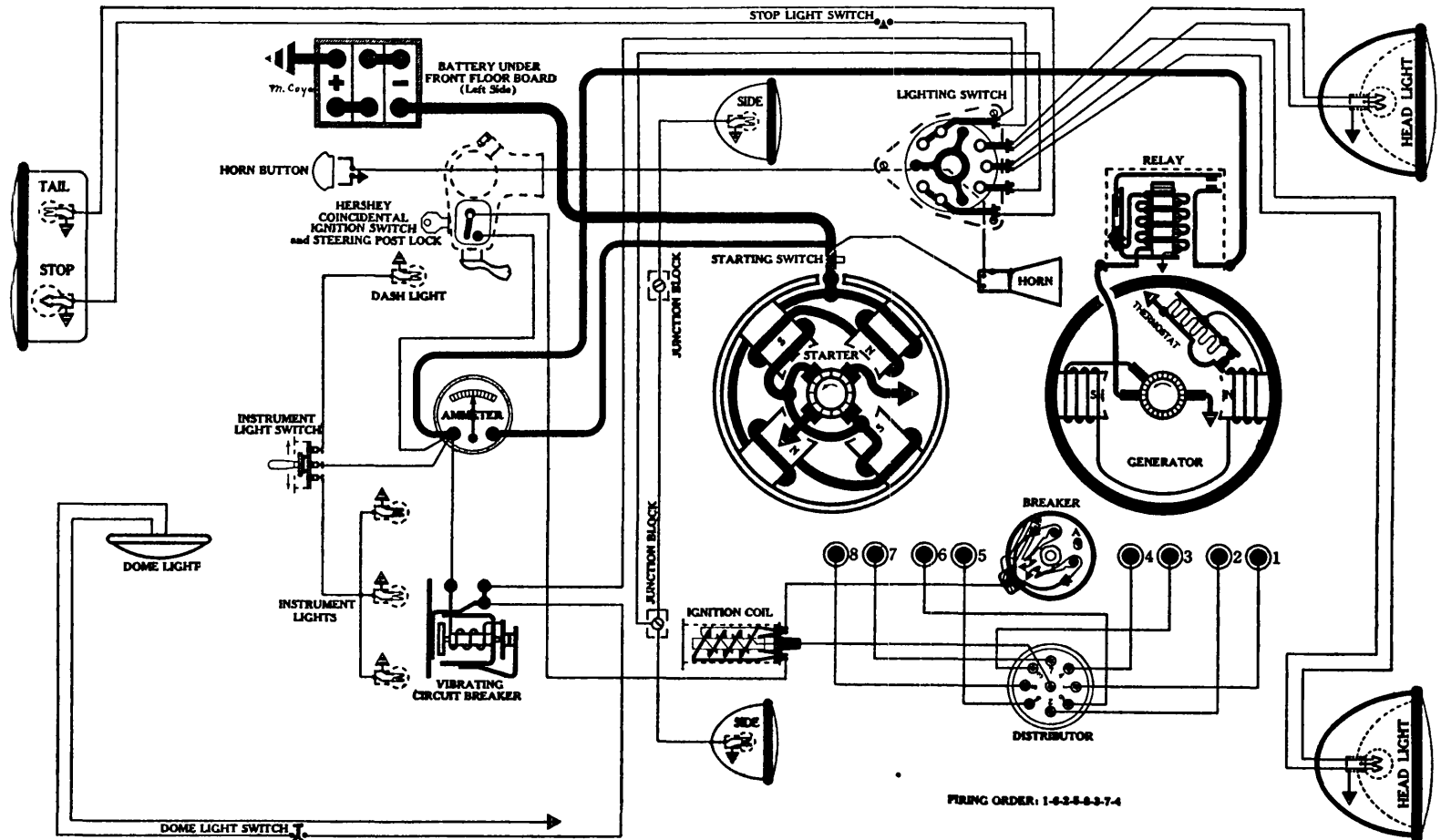
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25-30 amps. Operates 10-15.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; TAIL—63; INSTRUMENT—63; STOP—81; DOME—81; CORNER—81; DASH—63.

STUDEBAKER

Model, Commander Eight, (1929)



BATTERY

Willard, SJWR-3, 6 volts. Positive Terminal Grounded
Starting Capacity—104 amps. for 20 minutes.
Lighting Capacity—5 amps. for 18 hours.
Box—Length, 9 1/16; width, 7 1/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 726-G

Connection to Engine—Mechanical gear shift, incorporating an overrunning clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter.

Running Free—65 amps. at 5 volts, 6000 R. P. M.
Cranking Engine—185 to 190 amps. at 4.1 volts.
Lock Torque—15 pound-feet, 570 amps., 3.1 volts.
Brush Spring Tension—24 to 28 oz. on each.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 658V, 658Z

IMPORTANT NOTE: This unit uses a four-lobe cam with two breaker arms connected in parallel. Cam is so designed that one point is open when other is just breaking but closes few degrees after break occurs. The arms must be accurately synchronized to operate at intervals of exactly 45 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw "A" is provided, which moves one breaker assembly. Adjust by using Delco-Remy synchronizing tool No. 820738 or rotary spark gap on test bench. See detailed instructions P. 13, Sec. AA.

Breakers—Contact separation .022 inch.

Contact Spring Tension—15-20 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—7/8" long (AC type Z); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywh el).

Automatic Advance—22 degrees (on Flywheel).

Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance
(on flywh el) (on cam)

600	0-2	300	0-1
1000	6	500	3
1800	14	900	7
2800	22	1400	11

Coil—Delco-Remy, 528-E.

Ignition Switch—Hershey "Coincidental" — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-C

Performance Data—Gen cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	V lts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Field Test—4.75-5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7 1/2 volts.

Opens—0-2 1/2 amps. discharge.

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-E.

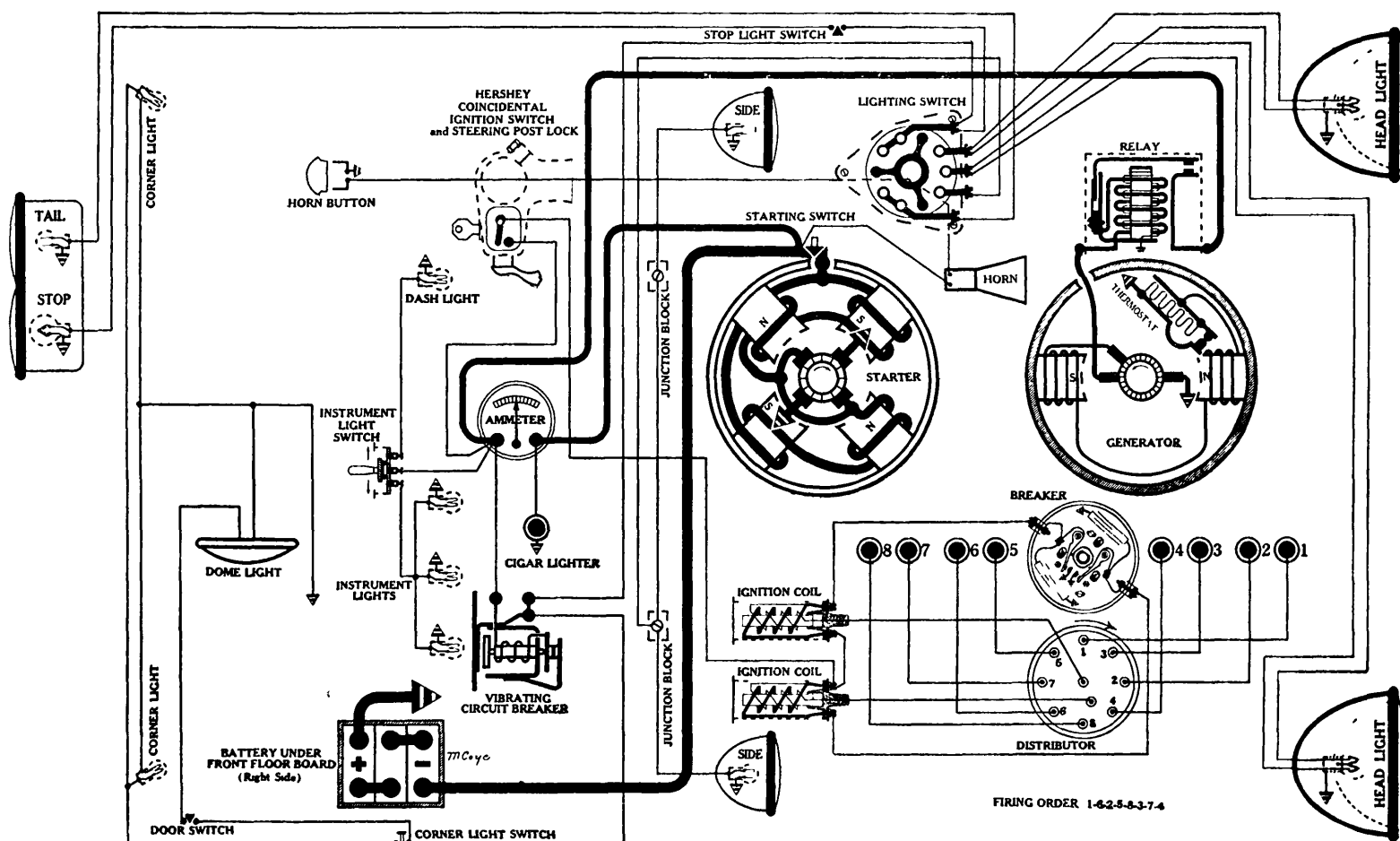
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25-30 amps. Op rates 10-15.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; TAIL—63; INSTRUMENT—63; STOP—81; DOME—81; CORNER—81; DASH—63.

STUDEBAKER

Mod 1 President, (1929-30)



BATTERY

Willard, SJWR-4, 6 volts. Positive Terminal Grounded
Starting Capacity—125 amps. for 20 minutes.
Lighting Capacity—5 amps. for 22 hours.
Box—Length, 10 5/6; width, 7 1/6; height, 9 3/4 inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 728-C

Connect to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on starter. This is a gear reduction job, a pinion being cut on the armature shaft.

Running Free—70 amps. at 5 volts, 2500 R. P. M.

Cranking Engine—150-160 amps. at 4.4 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 668-C

IMPORTANT NOTE This unit uses a four-lobe cam two independent breaker arms and two coils. The arms must be accurately synchronized to operate at intervals of 45 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw is provided, which moves one breaker assembly. Adjust by using Delco-Remy Synchronizing Tool No. 1-035009 or rotary spark gap on test bench. See detailed instructions P. 26, Sec. AA.

Breakers—Contact separation .022 inch.

Contact Spring Tension—17 to 21 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark

Spark Plugs—7/8" long body (AC type I); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—19 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist R.P.M.	Degrees Advance (on cam)
600	0-2	300	0-1
1000	4	500	2
1500	8	750	4
2500	14	1250	7
3200	19	1600	9 1/2

Coils—Delco-Remy, 528-E.

Ignition Switch—Hershey "Coincidental" — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-C

Performance Data—Gen cold Thermostat closed

Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE: Thermostat it opens about 165° F., reducing charging rate approx 30-40%.

Motoring Freely—5-5 1/2 amps at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Field Test—4.75-5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7 1/2 volts

Opens—0-2 1/2 amps. discharge

Contact Gap—.015-.025 inch.

Core Gap—.014-.018 inch, contacts closed

LIGHTING

Switch—Delco-Remy, 486-E.

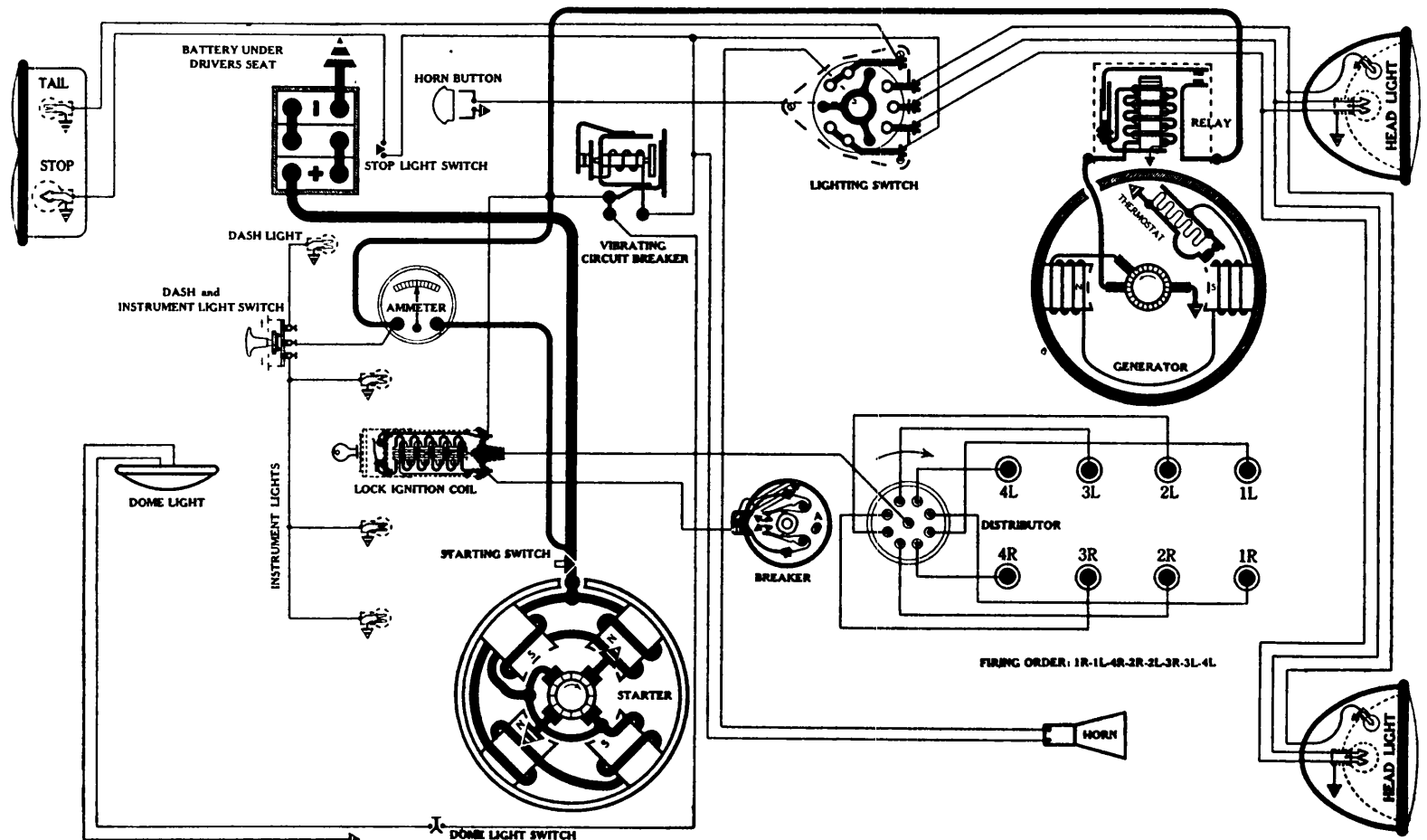
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25-30 amps. Operates 10-15.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; TAIL—63; INSTRUMENT—63; STOP—81; DOME—81; CORNER—81; DASH—63.

VIKING

Model, FV-8, (1929) Model V-30, (1930)

**BATTERY**

Willard, WSB-15, 6 volts. Negative Terminal Grounded
 Starting Capacity—114 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 20 hours.
 Box—Length, 10 5/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 725-H

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R. P. M.

Cranking Engine—165-185 amps. at 4.2 volts.

Lock Torque—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 658-T

IMPORTANT NOTE: This unit uses a four lobe cam with two breaker arms connected in parallel. Cam is so designed that one point is open when other is just breaking but closes few degrees after break occurs. The arms must be accurately synchronized to operate at intervals of exactly 45 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw "A" is provided, which moves one breaker assembly. Adjust by using Delco-Remy synchronizing tool No. 820738 or rotary spark gap on test bench. See detailed instructions P. 13, Sec. AA.

Breakers—Contact separation .022 inch.

Contact Spring Tension—15-20 oz. on each.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—Special Metric (AC type G-12); Gap .025 inch.

Firing Order—1R-1L-4R-2R-2L-3R-3L-4L.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—15 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
300	0-0	150	0-0
1000	2.5-6.5	500	1-3
1800	13-17	900	6.5-8.5

Coil—Delco-Remy, 528-Z.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 955-R

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-B.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

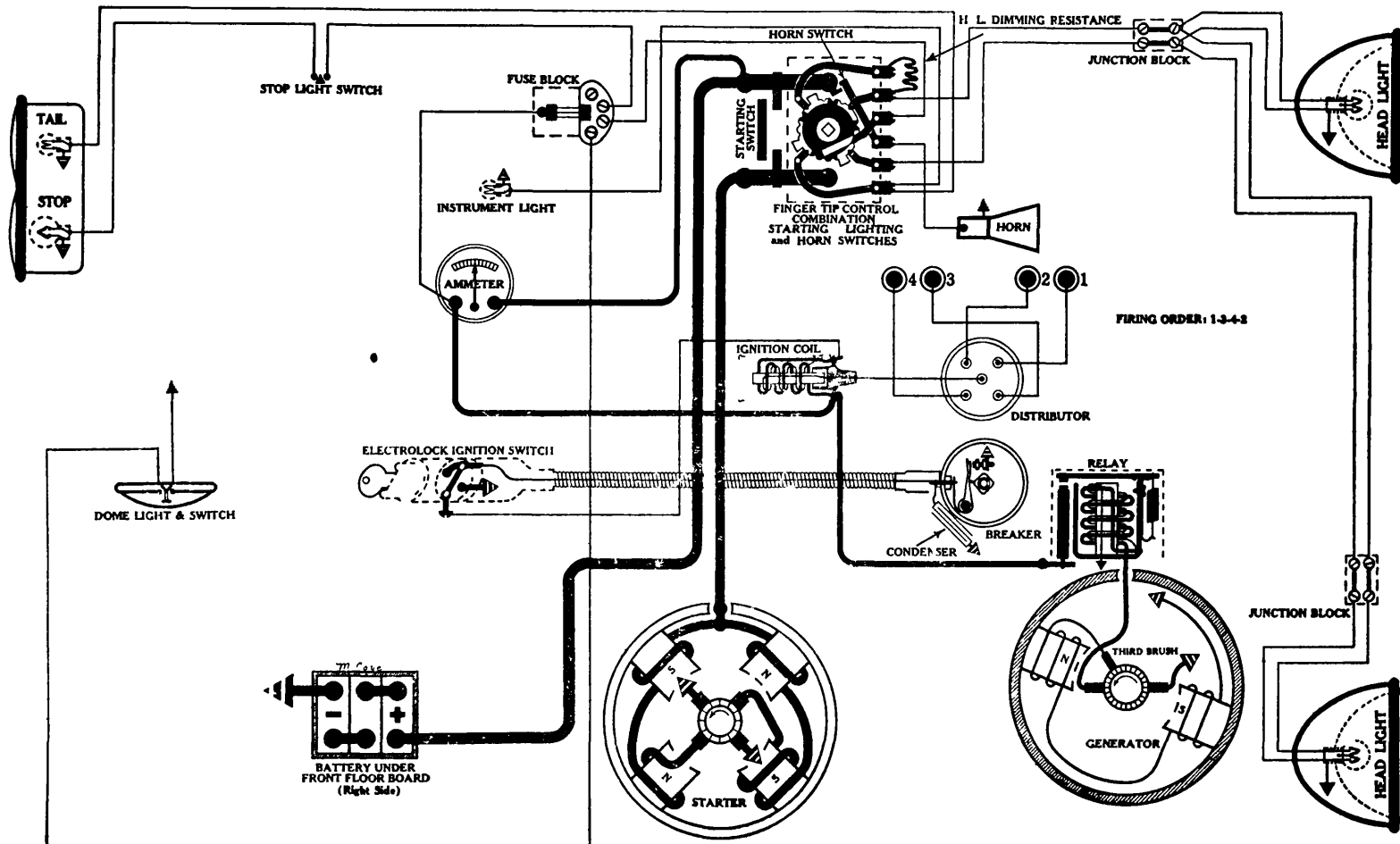
Vibrating Circuit Breaker—Delco-Remy, 410-C.

Starts, 25-30 amps. Operates, 10-15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

WHIPPET

Model 96-A, 4 Cyl., (1929-30)



BATTERY

U. S. L., 3-CVX-5X-6A, 6 volts. Negative Terminal Grounded

Starting Capacity—96 amps. for 20 minutes.

Lighting Capacity—5 amps. for 17 hours.

Box—Length, 9 1/16; width, 7; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MZ-4001

Connection to Engine—Bendix drive.

Running Free—60 amps at 5.5 volts.

Cranking Engine—180 amps. at 5.2 volts, 200 R. P. M.

Lock Torque—10 pound-feet, 490 amps., 3.6 volts.

Brush Spring Tension—20 to 24 oz. on each.

Starting Switch—Located foot of steering column. Operated by pulling up on horn button.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGB-4020-A

NOTE This unit is of the full automatic type, however, the spark may be retarded for starting, and on heavy grades, by pulling out on spark knob

Breaker—Contact separation .020 to .024 inch

Contact Spring Tension—18-20 oz.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.
Spark Plugs—7/8" Semi-Aircraft (AC type Y); Gap .025 inch.

Firing Order—1-3-4-2.

Manual Retard—14 degrees (on Flywheel).

Automatic Advance—24 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist R.P.M.	Degrees Advance (on cam)
800	0-1	400	0-5
1200	2	600	1
2400	14	1200	7
3000	20	1500	10
3400	24	1700	12

Coil—Auto-Lite, IG-4065.

Ignition Switch—"Electrolock", Type 9-A. For theory of operation and instructions on servicing see P. 21, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4116

Performance Data—Gen. cold

Amps	RPM	Volts	Amps	RPM	Volts
0	650	6.5	10	1075	7.3
2	720	6.6	14	1340	7.7
5	850	7.	16	1800	8.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—16-19 amps. at 6 volts.

Field Test—4.7 amps. at 6 volts across field coils in series.

Field Fuse—(None).

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7-7.5 volts.

Opens—1/2-2 1/2 amps. discharge.

Contact Gap—.025-.035 inch.

Core Gap—.010-.030 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton 40941 (Early 1929). Briggs & Stratton 50160 (Late 1929-30).

Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all being controlled by horn button on steering wheel. For details of construction and instructions on servicing see P. 28, Sec. AA.

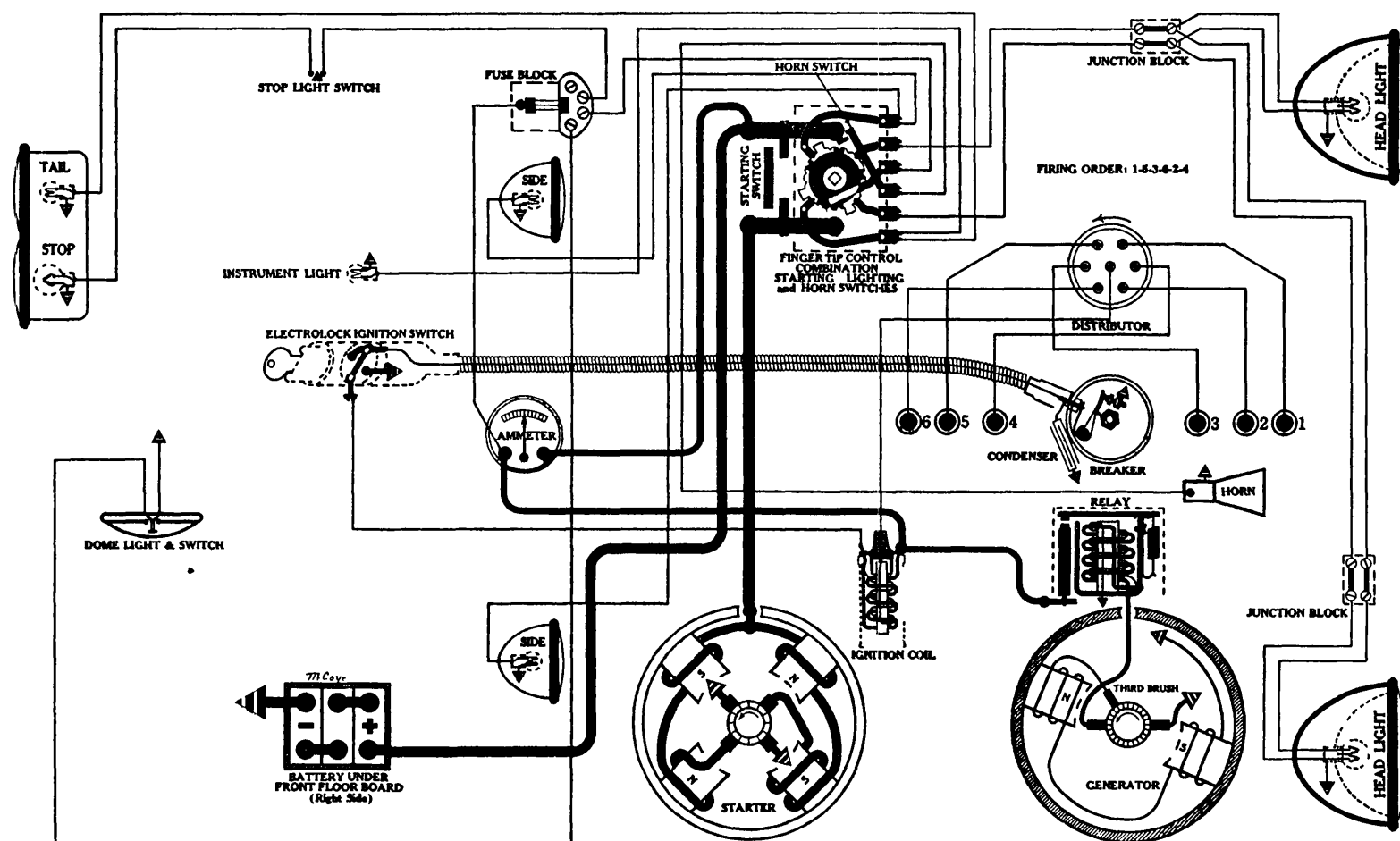
Fuses—Single 20 amp. fuse mounted on block under engine hood (1 ft side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); INSTRUMENT—63; DOME—63; STOP AND TAIL (Single Socket)—1158.

NOTE This is the old style Ford headlight bulb with two filaments; make sure the 3 C. P. filament burns for tail light.

WHIPPET

Mod 1, 98-A, 6 Cyl., (1929-30)



BATTERY

U. S. L., 3-CVX-5X-6A, 6 volts. Negative Terminal Grounded

Starting Capacity—96 amps. for 20 minutes.

Lighting Capacity—5 amps. for 17 hours.

Box—Length, 9 1/16; width, 7; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MZ-4011

Connection to Engine—Bendix drive.

Running Free—60 amps at 5.5 volts.

Cranking Engine—180 amps. at 5.2 volts, 200 R. P. M.

Lock Torque—10 pound-feet, 490 amps., 3.6 volts.

Brush Spring Tension—20 to 24 oz. on each.

Starting Switch—Located foot of steering column. Operated by pulling up on horn button.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGB-4021

NOTE This unit is of the full automatic type, however, the spark may be retarded for starting, and on heavy grades, by pulling out on spark knob

Breaker—Contact separation .020 to .024 inch.

Contact Spring Tension—18-20 oz.

Timing—See detailed instructions P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.

Spark Plugs—7/8" long (AC type Z); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Manual Retard—20 degrees (on flywheel)

Automatic Advance—24 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist. RPM	Degrees Advance (on cam)
600	Start	300	Start
1200	4	600	2
2000	12	1000	6
3000	20	1500	10
3400 (Max)	24	1700	12

Coil—Auto-Lit, IG-4065.

Ignition Switch—"Electrolock", Type 9-A. For theory of operation and instructions on servicing see P. 21, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite GAL-4106

Performance Data—Gen. cold.

Amps	RPM.	Volts	Amps	RPM	Volts
0	650	6.5	10	1075	7.3
2	720	6.6	14	1340	7.7
5	850	7.	16	1800	8.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—16-19 amps. at 6 volts.

Field Test—4 1/2 amps at 6 volts across field coils in series.

Field Fuse—(None).

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7-7.5 volts.

Opens—1/2-2 1/2 amps. discharge.

Contact Gap—.025-.035 inch.

Core Gap—.010-.030 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton 40941.

Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all being controlled by horn button on steering wheel. For details of construction and instructions on servicing see P. 28, Sec. AA.

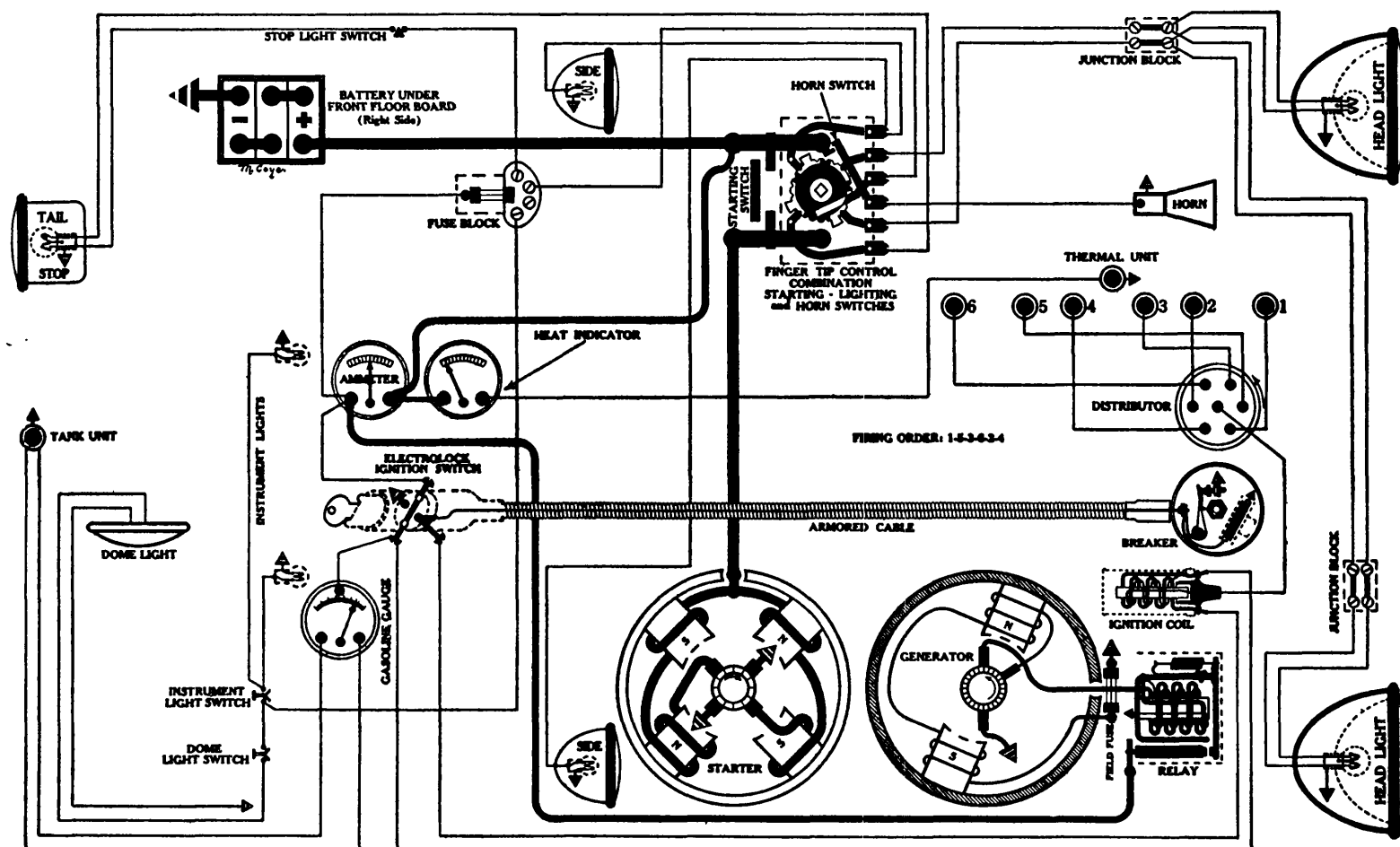
Fuses—Single 20 amp. fuse mounted on block under engine hood (left side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); INSTRUMENT—63; DOME—63; STOP AND TAIL (Single Socket)—1158.

NOTE: This is the old style Ford headlight bulb with two filaments, make sure the 3 C. P. filament burns for tail light.

WILLYS-KNIGHT

Model 70-B, (1929-30)



BATTERY

U. S. L., 3-HVX-6X-6A, 6 volts. Negative Terminal Grounded

Starting Capacity—127 amps. for 20 minutes.

Lighting Capacity—5 amps. for 23½ hours.

Box—Length, 10 7/16; width, 7; height, 9¾ inches.

STARTER

Rotation, R. H., Com. End
Auto-Lite, MAB-4014

Connection to Engine—Bendix drive.

Running Free—60 amps. at 6 volts.

Cranking Engine—160-170 amps. at 5 volts.

Lock Torque—17 pound-feet, 520 amps. at 3 volts.

Brush Spring Tension—24-28 oz. on each.

Starting Switch—Located foot of steering column. Operated by pulling up on horn button.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGC-4004

Breaker—Contact separation, .018 to .022 inch.

Contact Arm Spring Tension—18 to 20 oz.

Timing—See detailed instructions, P. 1, Sec. AA.

1—Locate T. D. C. 2—Locate rotor. 3—Set spark.
Spark Plugs—7/8 inch standard (Champion No. 1); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600.....	0-1.....	300.....	0-5.....
1300.....	8.....	650.....	4.....
2000.....	16.....	1000.....	8.....
2400.....	20.....	1200.....	10.....

Coil—Auto-Lite, IG-4065.

Ignition Switch—"Electrolock", Type 9-B. For details of construction and instructions on servicing see P. 22, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, Type GAL-4103

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
2.....	620.....	6.6	14.....	1050.....	7.7
5.....	700.....	7.	16.....	1200.....	7.9
10.....	860.....	7.3			

Maximum Charging Rate (cold)—19 amps. at 8 volts or 17.75 amps. at 7.5 volts.

Motoring Freely—5 amps. at 6 volts.

Max. Stall Current—18 amps. at 6 volts.

Field Test—4.3 amps. at 6.2 volts directly across field coils in series.

Field Fuse—5 amps.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7-7.5 volts.

Opens—½-2½ amps. discharge.

Contact Gap—.025-.035 inch.

Core Gap—.010-.030 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton 40941 (Early 1929). Briggs & Stratton 50160 (Late 1929-30).

Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all being controlled by horn button on steering wheel. For details of construction and instructions on servicing see P. 28, Sec. AA.

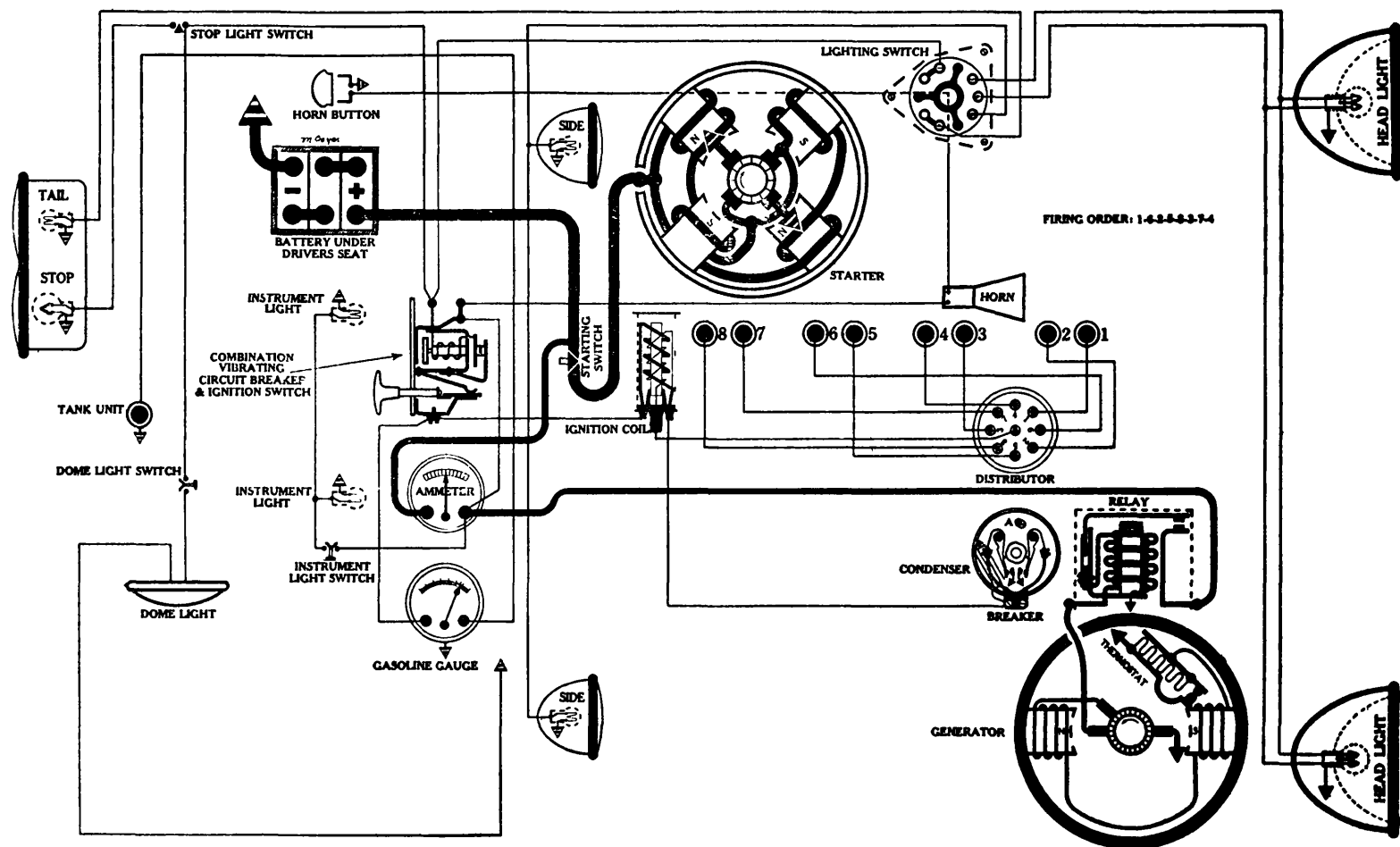
Fuses—Single 20 amp. fus. mounted on block under engine hood (1 ft. side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); INSTRUMENT—63; DOME—63; STOP AND TAIL (Single Socket)—1158.

NOTE: This is the old style Ford headlight bulb with two filaments; make sure the 3 C. P. filament burns for tail light.

WINDSOR

Models, 8-82 and 8-92, (1929-30)



BATTERY

U. S. L., 3-HVX-8X-4, 6 volts. Negative terminal grounded
 Starting Capacity—170 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 33 hours.
 Box—Length, 13 1/16; width, 7 7/16; height, 9 3/4 inches

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 724-J

Connection to Engine—Bendix drive

NOTE Gear reduction job Pinion cut on armature shaft drives pinion on Bendix shaft

Running Free—70 amps. at 5 volts, 3500 R. P. M.

Cranking Engine—160-170 amps. at 4.6 volts

Lock Torque—22 pound-feet, 600 amps, 3 volts.

Brush Spring Tension—24-28 oz. on each.

Starting Switch—Delco-Remy, 406-A.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 658-H

IMPORTANT NOTE This unit uses a four-lobe cam with two breaker arms connected in parallel. Cam is so designed that one point is open when other is just breaking but closes few degrees after break occurs. The arms must be accurately synchronized to operate at intervals of exactly 45 degrees of distributor travel, corresponding to 90 degrees on flywheel. An eccentric adjusting screw "A" is provided, which moves on breaker assembly. Adjust by using Delco-Remy synchronizing tool No. 820738 or rotary spark gap on test bench. See detailed instructions P. 13, Sec. AA.

Breakers—Contact separation .022 inch.

Contact Spring Tension—17-21 oz. on each.

Timing—See detailed instructions, P. 1, Sec. AA

1—Locate T. D. C. 2—Locate rotor. 3—Set spark

Spark Plugs—Regular metric (AC type G); Gap .025 inch

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—22 degrees (on Flywheel).

Automatic Advance—18 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
600	0-1	300	0-5
1000	4	500	2
1500	9	750	4.5
2500	12	1250	6
3200	17-18	1600	8.5-9

Coil—Delco-Remy, 525-C.

Ignition Switch—Delco-Remy, 1325.

Location—On instrument board.

NOTE This unit combines a vibrating circuit breaker with switch. Ignition circuit not thru vibrator

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 940-N

Performance Data—Gen. cold. Thermostat closed.

Amps	RPM	Volts	Amps	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4.75-5 amps at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7-7 1/2 volts

Opens—0-2 1/2 amps. discharge.

Contact Gap—.015-.025 inch

Core Gap—.014-.018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 1309.

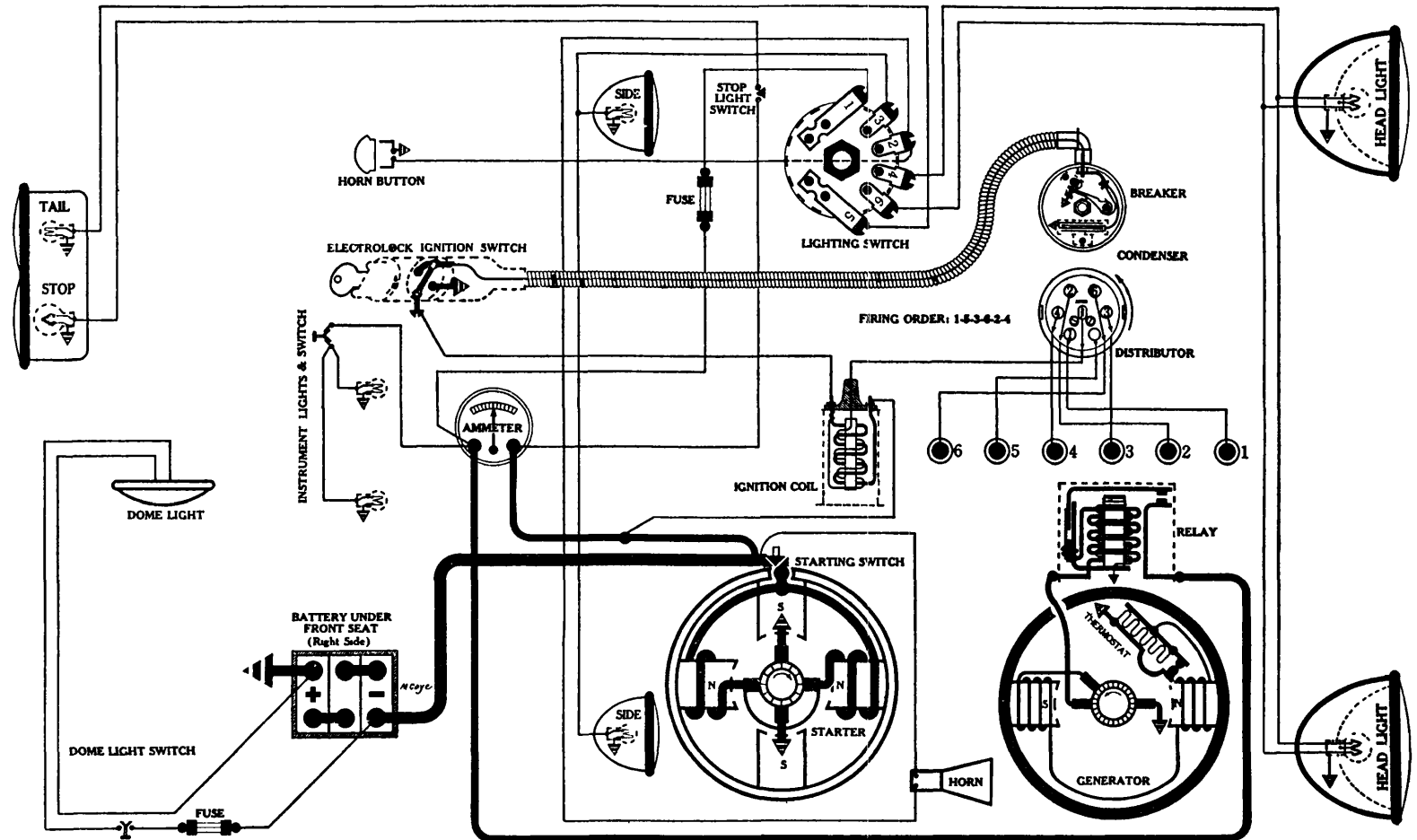
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Starts 25-30 amps. Operates 10-15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; TAIL—63; DOME—63; STOP—87.

AUBURN

Model, 6-85, 6 cyl., (1930)



BATTERY

U. S. L., XY-13X-7A, 6 volts. Positive Terminal Grounded
Starting Capacity—102 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17½ hours.
Box—Length, 9 1/16; width, 7¼; height, 9¼ inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 716-C

Connection to Engine—Bendix drive.

NOTE Gear reduction job A 14 T pinion cut on armature shaft drives 22 T pinion on Bendix shaft

Running Free—50 amps. at 5 volts, 4000 R.P.M

Cranking Engine—175-180 amps. at 4.5 volts.

Lock Torque—14 pound-feet, 350 amps, 3.2 volts

Brush Spring Tension—24-26 oz. on each.

Starting Switch—Delco-Remy, 821627.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 641-F

Breaker—Contact separation .022 inch.

Contact Spring Tension—18 to 20 oz.

Timing—With No. 1 Piston on T.D.C., power stroke, fly-wheel mark "No. 1 T.D.C." opposite pointer, spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal; breaker points should just open.

Spark Plugs—7/8 inch (Champion No. 4); Gap .025 inch.

Firing Order—1-5-3-6-2-4

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	0	200	0
800	4	400	2
1200	8	600	4
1600	12	800	6
2000	16	1000	8
2400	20	1200	10
2600	22	1300	11

Coil—Delco-Remy, 528-C.

Ignition Switch—"Electrolock", Type 9-A. For theory of operation and instructions on servicing see P. 21, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-H

Performance Data—Gen. cold. Thermostat clos d.

Amps	RPM	Volts	Amps.	RPM	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE Thermostat opens about 165° F, reducing charging rate approx 30-40%.

Motoring Freely—5-5½ amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4¾ to 5½ amps. at 6 volts across field coils in series.

Brush Spring Tension—16-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 360-A.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

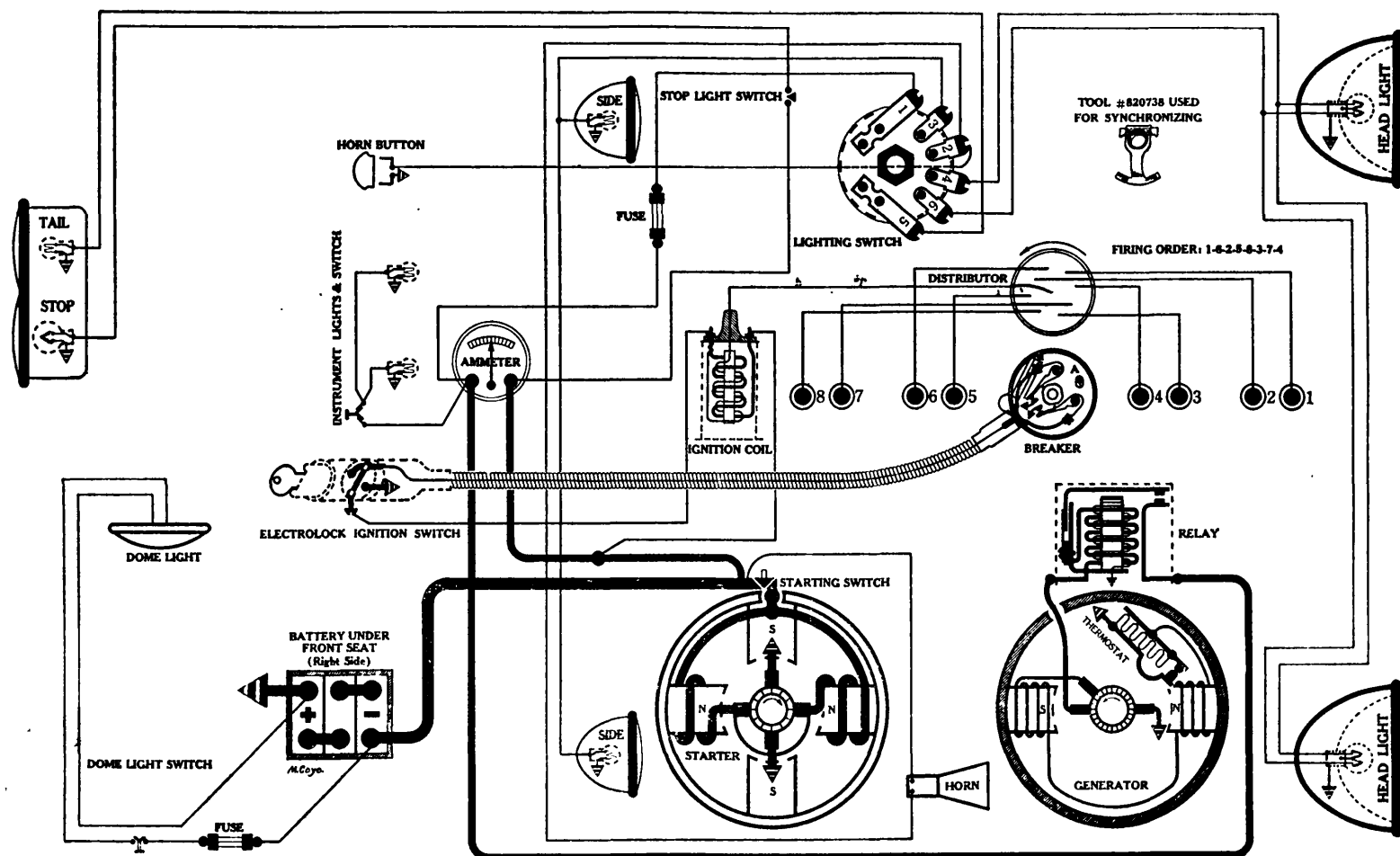
Fuses (Lighting)—Single, 20 amp. located behind instrument board, 1 ft side.

Fus (Body Lights)—Single 10 amp. located in battery compartment under front seat, right side.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; TAIL—63; STOP—87; DOME—63.

AUBURN

Model, 8-95, Straight Eight, (1930)



BATTERY

U. S. L., XY-13X-7A, 6 volts. Positive Terminal Grounded
Starting Capacity—102 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17½ hours.
Box—Length, 9 1/16; width, 7¼; height, 9¼ inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 716-C

Connection to Engine—Bendix drive.

NOTE: Gear reduction job. A 14 T. pinion cut on armature shaft drives 22 T. pinion on Bendix shaft.

Running Free—50 amps. at 5 volts, 4000 R. P. M.

Cranking Engine—175-180 amps. at 4.5 volts.

Lock Torque—14 pound-feet, 350 amps., 3.2 volts.

Brush Spring Tension—24-26 oz. on each.

Starting Switch—Delco-Remy, 821627.

IGNITION

Rotation, L. H., Top View
Delco-Remy 657-P

Breakers—Contact separation .022 inch.

Contact Spring Tension—18 to 20 oz. on each.

Timing—With No. 1 Piston on T.D.C., power stroke, fly-wheel mark "No. 1-T.D.C." opposite pointer, spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal; breaker points should just open.

Spark Plugs—7/8 inch (Champion No. 4); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—15 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
300	0-0	150	0-0
1000	2.5-6.5	500	1-3
1800	13-17	900	6.5-8.5

Coil—Delco-Remy, 528-C.

Ignition Switch—"Electrolock", Type 9-A. For theory of operation and instructions on servicing see P. 21, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy 955-H

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

Note: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4¾ to 5½ amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 360-A.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

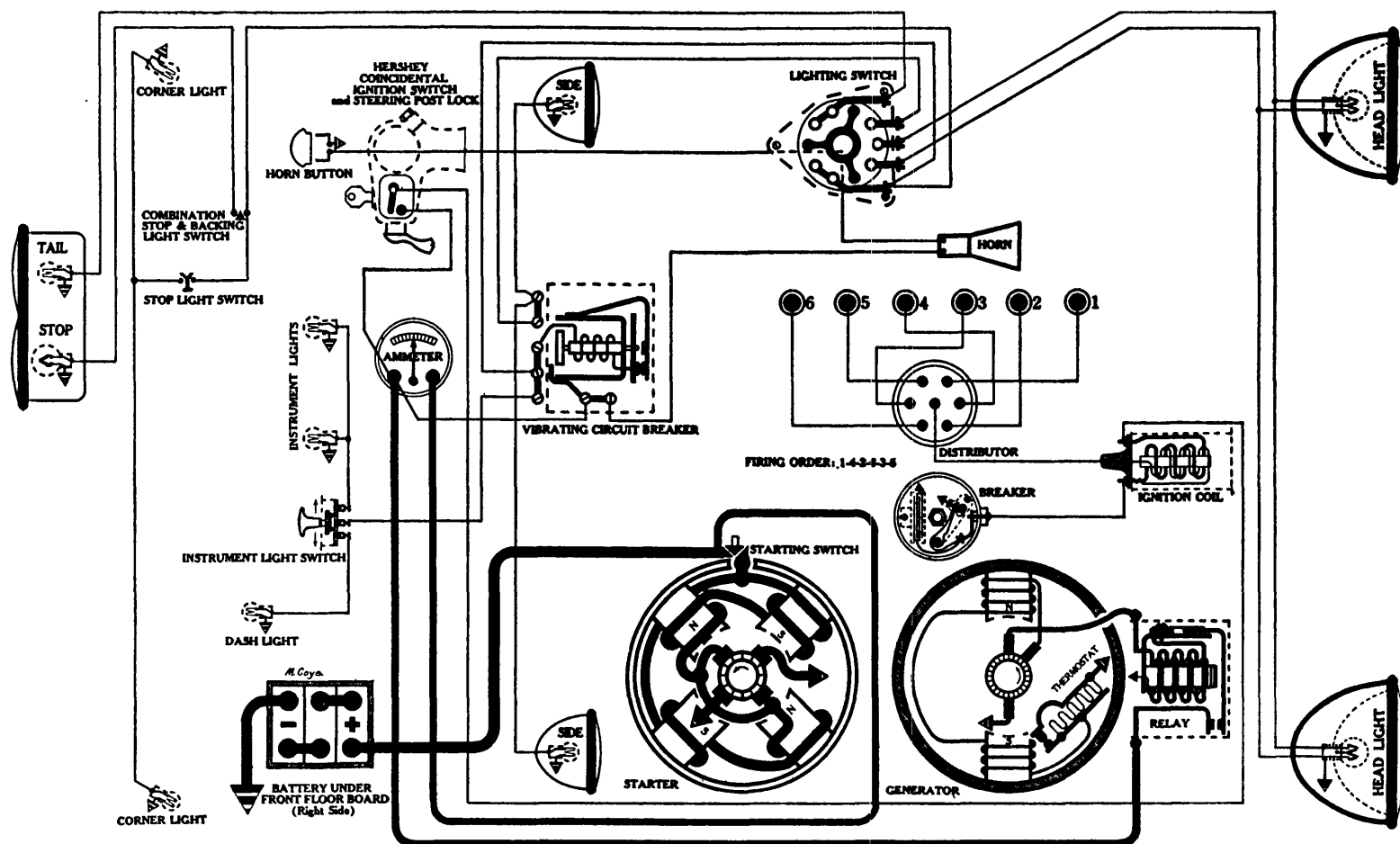
Fuses (Lighting)—Single, 20 amp. located behind instrument board, left side.

Fuse (Body Lights)—Single 10 amp. located in battery compartment under front seat, right side.

Lamps—See P. 3, Sec. AA. **HEAD**—1110 (Bifocal); **SIDE**—63; **INSTRUMENT**—63; **TAIL**—63; **STOP**—87; **DOME**—63.

BUICK

Model 40, (1930)



BATTERY

Exide, 3-MXV-13-1, 6 volts. Negative Terminal Grounded
 Starting Capacity—114 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 20 hours.
 Box—Length, 9 1/16; width, 7; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 725-D

Connection to Engine—Mechanical gear shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R.P.M.
 Cranking Engine—165-185 amps. at 4.2 volts.
 Lock Torque—16 pound-feet, 600 amps. at 3 volts.
 Brush Spring Tension—24 to 28 oz. on each.
 Starting Switch—Delco-Remy, 16210.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 640-Y

Breaker—Contact separation .020 inch.
 Contact Spring Tension—18 to 20 oz.
 Timing—With No. 1 Piston on compression stroke, flywheel mark "17°" opposite index line, spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal; breaker points should just open.
 Spark Plugs—Metric (AC Type G-12); Gap .025 inch.
 Firing Order—1-4-2-6-3-5.
 Manual Advance—24 degrees (on Flywheel).
 Automatic Advance—34 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
500.....	0.....	250.....	0.....
800.....	3.....	400.....	1.5.....
1200.....	8.....	600.....	4.....
1800.....	15.....	900.....	7.5.....
2400.....	22.....	1200.....	11.....
2800.....	27.....	1400.....	13.5.....
3400.....	34.....	1700.....	17.....

Coil—Delco-Remy, 528-H.

Ignition Switch—Hershey-Oakes Steering Ignition Lock —
 Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 940-M

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0.....	450.....	6.5.....	12.....	1000.....	7.8.....
5.....	700.....	7.1.....	14.....	1200.....	7.9.....
10.....	850.....	7.5.....	18-20 (Max.).....	1300.....	8.....

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5 1/2 amps. at 6 volts.

Max. Stall Current—19 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—22 to 26 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.
 Opens—0 to 3 amps. discharge.
 Contact Gap—.015 to .025 inch.
 Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 484-F.

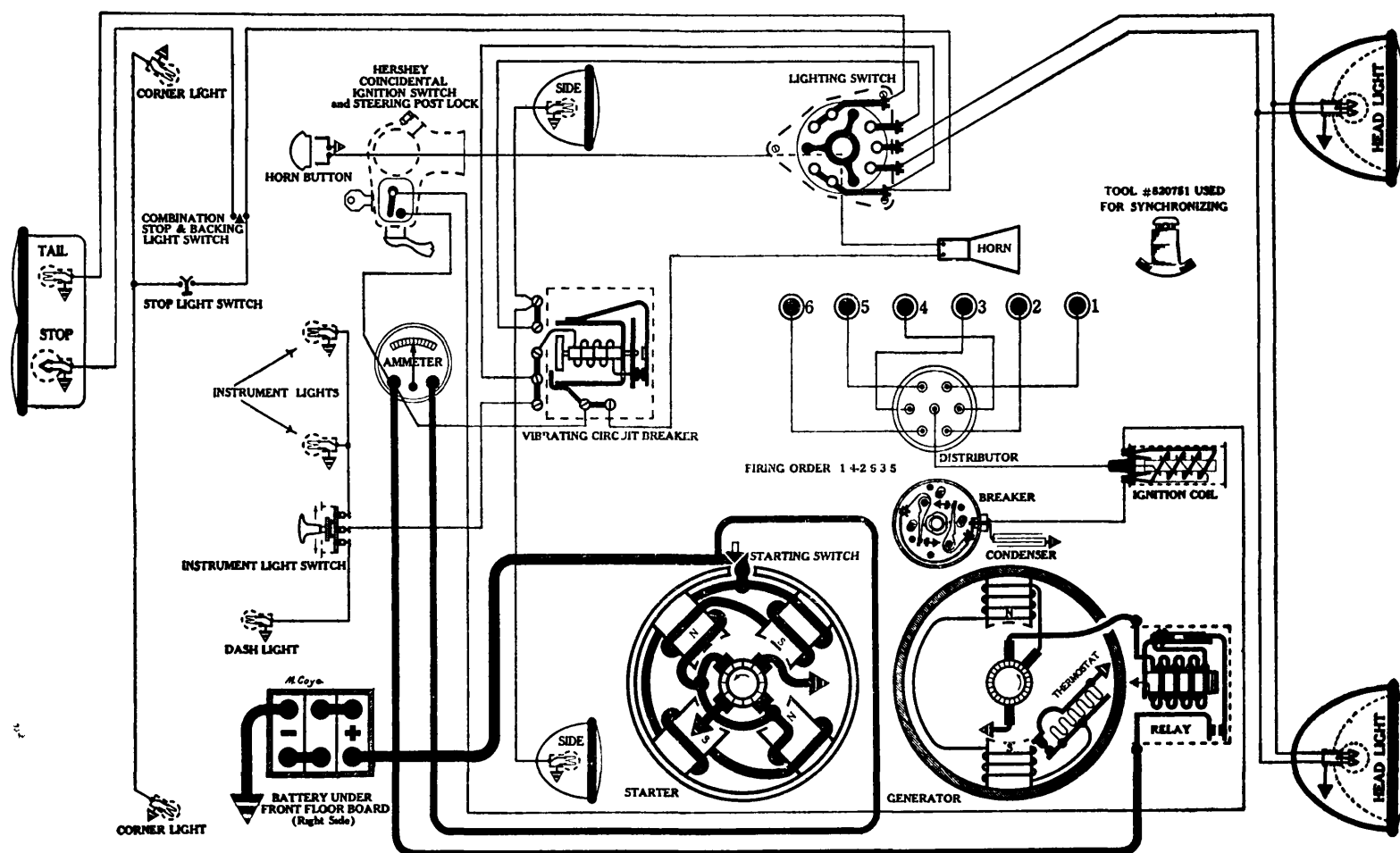
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-A. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; TAIL—63; TONNEAU—63; INSTRUMENT—63; DOME—81; STOP—87; CORNER—63.

BUICK

Models 50 and 60, 1930



BATTERY

Exide, 3-MXV-15-1, 6 Volts. Negative Terminal Grounded
Starting Capacity—133 amps. for 20 minutes.
Lighting Capacity—5 amps. for 24 hours.
Box—Length, 10 9/32; width, 7; height, 9 21/32 inches

STARTER

Rotation, L. H., Com. End
Delco-Remy, 725-D

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps at 5 volts, 6000 R. P. M.

Cranking Engine—165-185 amps. at 4.2 volts.

Lock Torque—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 16210.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 650-B

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Timing—With No. 1 Piston on compression stroke, flywheel mark "17°" opposite index line, park fully advanced, rotor opposite No. 1 Dist Cap Terminal; stationary breaker points should just open.

Spark Plugs—Metric (AC Type G-12); Gap .025 inch.

Firing Order—1-4-2-6-3-5.

Manual Advance—24 degrees (on Flywheel)

Automatic Advance—24 degrees (on Flywheel).

Eng R P M	Degrees Advance (on flywheel)	Dist R P M	Degrees Advance (on cam)
500	0	250	0
800	4	400	2
1200	8	600	4
1800	16	900	8
2400	23	1200	11.5
2600	24	1300	12

Coil—Delco-Remy, 528-H.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—
Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 940-M

Performance Data—Gen. cold. Thermostat closed.

Amps	R P M	Volts	Amps	R P M	Volts
0	450	6.5	12	1000	7.8
5	700	7.1	14	1200	7.9
10	850	7.5	18-20 (Max.)	1300	8.

Note: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5 1/2 amps. at 6 volts.

Max. Stall Current—19 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—22 to 26 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 484-F.

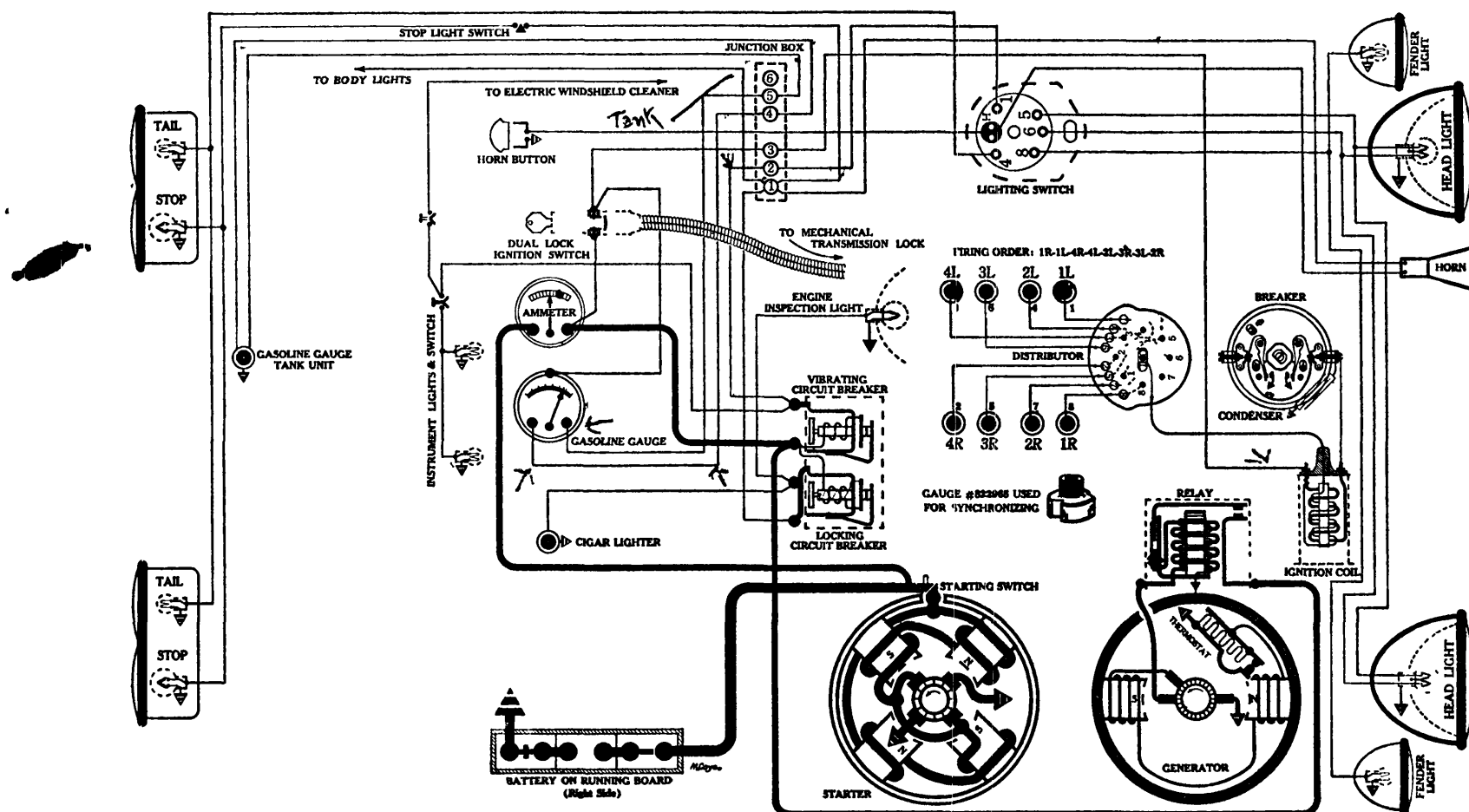
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-A. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; TAIL—63; TONNEAU—63; INSTRUMENT (Direct and indirect)—63; DOME AND CORNER—81; STOP—87.

CADILLAC

Model, 353, (193J)



BATTERY

Exide, 3-LXV-15-2G, 6 volts. Positive Terminal Grounded

Starting Capacity—150 amps. for 20 minutes.

Lighting Capacity—5 amps. for 29 hours.

Box—Length, 20 7/16; width, 5 1/2; height, 8 11/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 728-D

Connection to Engine—Mechanical gear shift, incorporating an overrunning clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter. Gear reduction job.

Running Free—70 amps at 5 volts, 2500 R.P.M.

Cranking Engine—245-260 amps. at 4 volts

Lock Torque—28 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each

Starting Switch—Delco-Remy, 16210.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 4050 or 4055 or 4056

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each

Timing—With No. 1L Piston on compression stroke, flywheel mark "IG-A" opposite indicator, spark lever full advance in "starting range", rotor opposite No. 1 Dist. Cap Terminal; stationary breaker points should just open.

Firing Ord r—1R-1L-4R-4L-2L-3R-3L-2R.

Spark Plugs—Metric (AC Type G-10); Gap .025 inch.

Manual Advance—40 degrees (on Flywheel).

Automatic Advance—30 degrees (on Flywheel).

Eng R P M	Degrees Advance (on flywheel)	Dist R P M	Degrees Advance (on cam)
1000	0-2	500	0-1
1500	6-8	750	3-4
2500	14-16	1250	7-8
3000	22-24	1500	11-12
3800	28-30	1900	14-15

Coil—Delco Remy, 530-B.

Ignition Switch—Delco-Remy, 426-L, 426-M, or 426-P "Dual Lock". (Combination Ignition Switch and Mechanical Transmission Lock).

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-D
Same as La Salle, Model 340, (1930)

RELAY

Delco-Remy, 266-N

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-H.

Location—Foot of Steering Column. Lights controlled by lever on steering wheel.

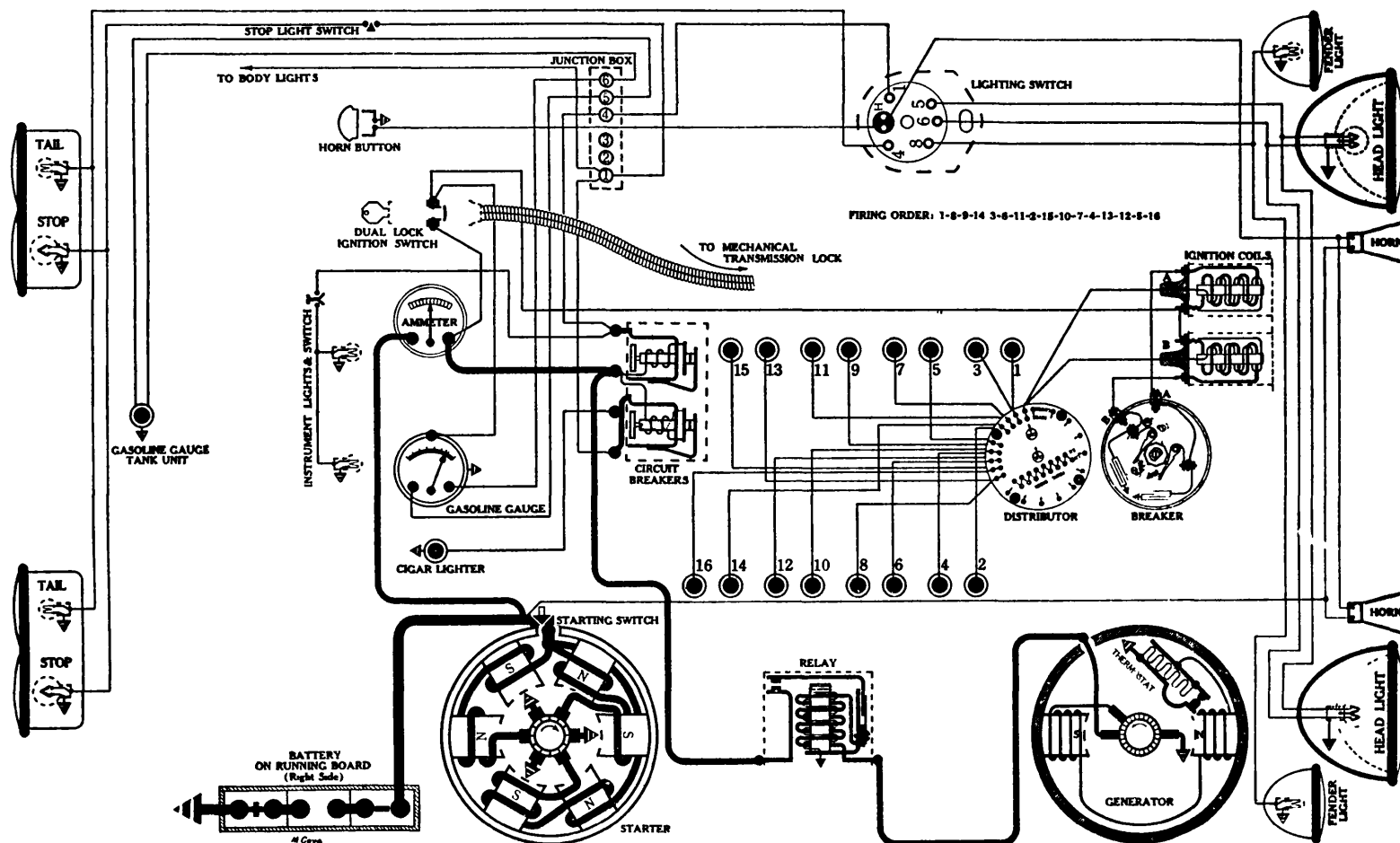
Circuit Breaker—Delco-Remy, 5759.

Vibrating—Starts 25-30 amps. Operates 10-15. Lock-Out—Starts 25-30 amps. Operates with discharge less than 1 ampere.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; STOP—87; TAIL—63; ENGINE INSPECTION—87; INSTRUMENT—63.

CADILLAC

Model, 452, 16 Cyl., (1930)



BATTERY

Exide, 3-XCRV-21-2G, 6 Volts. Positive Terminal Grounded

Starting Capacity—163 amps. for 20 minutes

Lighting Capacity—5 amps. for 30 hours

Box—Length, 20 7/16; width, 5 1/2, height, 8 11/16 inches

STARTER

Rotation, L. H., Com. End
Delco-Remy, 457

Connection to Engine—Mechanical gear shift, incorporating an overrunning clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter.

Running Free—70 amps. at 5 1/2 volts, 2200 R.P.M.

Cranking Engine—265 to 280 amps at 4 volts.

Lock Torque—35 pound-feet, 600 amps at 3 volts.

Brush Spring Tension—36 to 40 oz. on each

Starting Switch—Delco-Remy, 16210

IGNITION

Rotation, R. H., Top View
Delco-Remy, 4057

Breakers—Contact separation .015 inch.

NOTE: Due to the peculiar design of the ignition cam, to insure good high speed performance the contact separation must be accurately adjusted to .015 inch and no more.

Contact Spring Tension—18 to 20 oz. on each.

Timing—With No. 1 Piston on compression stroke, flywheel mark "IG-A" opposite indicator, spark fully advanced, rotor opposite No. 1 Dist Cap Terminal, stationary breaker points should just open.

Firing Order—1-8-9-14-3-6-11-2-15-10-7-4-13-12-5-16

NOTE: All odd cylinder numbers on left bank, No. 1 nearest radiator; all even numbers on right bank (see diagram).

Spark Plugs—Metric (AC Type G-10); Gap .025 to .028 inch.

Manual Advance—38 degrees (on Flywheel).

Automatic Advance—32 1/2 degrees (on Flywheel)

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
600	0	300	0
800	3	400	1 5
1000	6	500	3
1600	14	800	7
2000	20	1000	10
2600	29	1300	14 5
2800	32 5	1400	16

Coils—Delco-Remy, 530-G.

Ignition Switch—Delco-Remy, 426-M "Dual Lock" (Combination Ignition Switch and Mechanical Transmission Lock).

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-E

Performance Data—Gen. cold. Thermostat closed.

Amps	RPM	Volts	Amps	RPM	Volts
0	575	6.5	11	1000	7.9
3	700	7	15	1200	8.1
6	800	7.1	20	1450 (Max)	8.3

Note: Thermostat opens about 165° F., reducing charging rate approx 30-40%.

Motoring Freely—3 1/2 to 4 amps. at 6 volts.

Max. Stall Current—22 amps at 6 volts.

Field Test—2 1 amps. at 6 volts, across field coils in series.

Brush Spring Tension—16 to 20 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-E

Closes—7 to 7 1/2 volts

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch

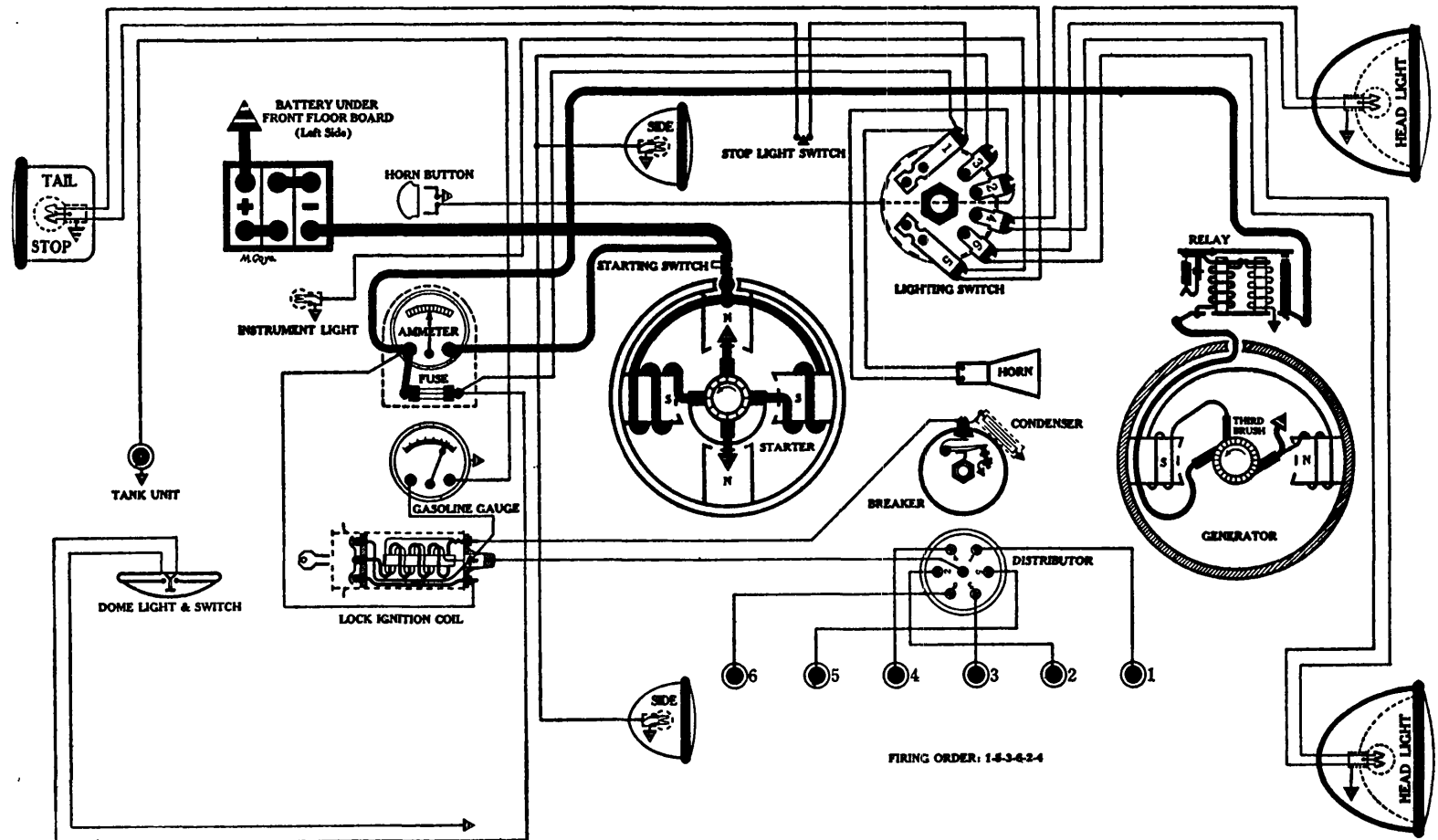
Cor Gap—.014 to .018 inch, contacts closed

LIGHTING

Same as Cadillac Mod 1353 (1930)

CHRYSLER

Mod 1, Standard Little Six, (1930)



BATTERY

Willard WS-1-13, 6 volts. Positive Terminal Grounded
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17 hours.
Box—Length, 9 1/16; width, 7 1/16; height, 8 7/8 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-Q

Connection to Engine—Mechanical gear shift incorporating overrunning disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—160 to 180 amps. at 4.2 volts.
Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 820052.

IGNITION

Rotation, R. H., Top View
North East, Model TBU, Type 1229

Breaker—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz.
Timing—Set ignition 23 flywheel degrees before T.D.C. with spark fully advanced.
Spark Plugs—Metric (AC Type G-11); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Manual Advance—25 degrees (on Flywheel).
Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0	300	0
800	4	400	2
1200	6	600	3
1800	12	900	6
2200	16	1100	8

Lock Ignition Coil—Delco-Remy, 526-L.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.", "Gauge", and "Timer". Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

North East, Model LAB, Type 6530

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	15	1400	8.
5.5	1000	7.2	18.5	1800	8.2
11	1200	7.9	19	2000 (Max.)	8.3

Motoring Freely—4 to 5 amps. at 6 volts.

Max. Stall Current—21 to 23 amps. at 6 volts.

Field Test—3 amps. at 6 volts, across field coils in series.

Brush Spring Tension—12 to 16 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

North East, Type 20220

Closes—7 to 7 1/2 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.020 to .025 inch.

Core Gap—.015 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5500-A.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

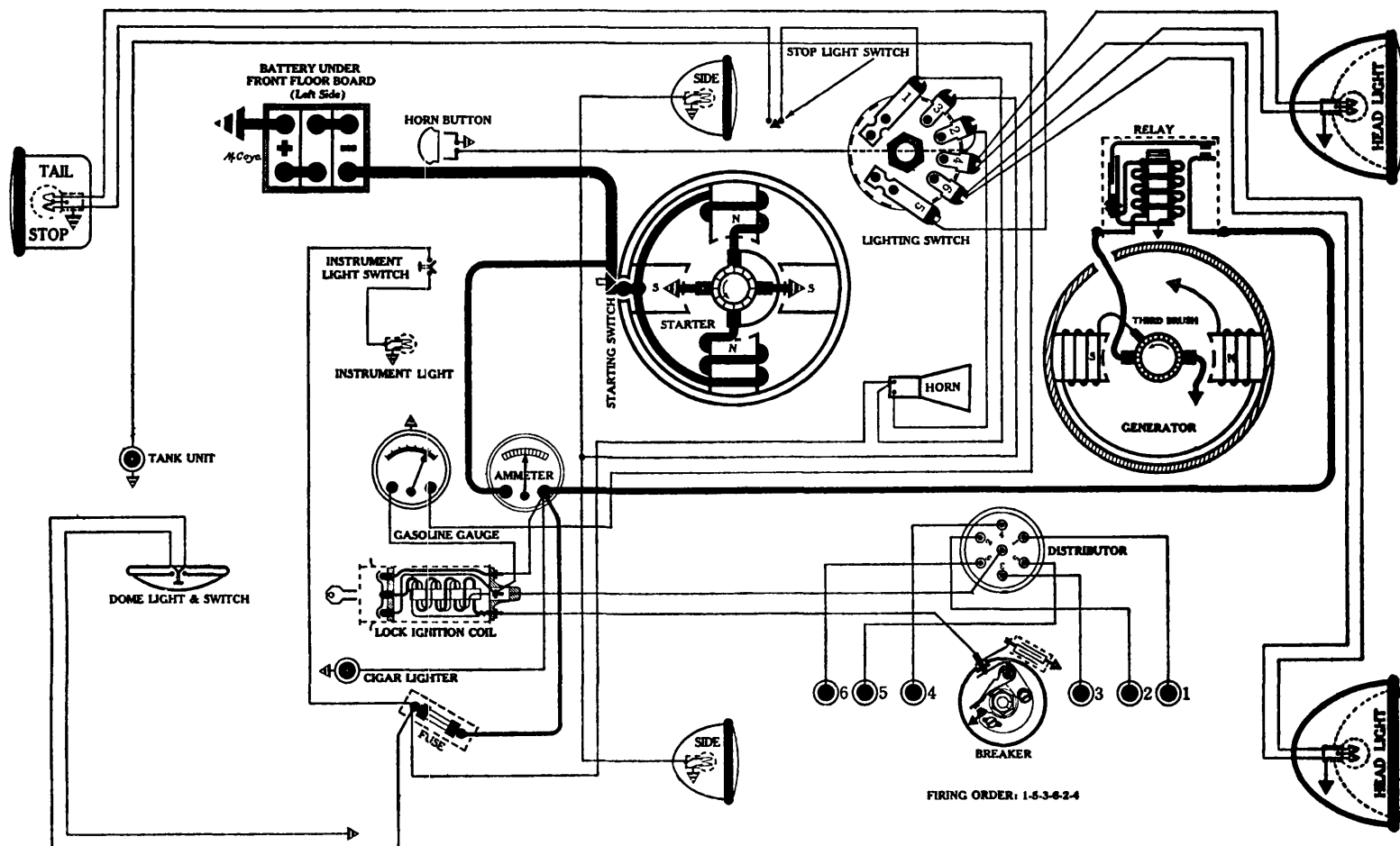
Fuses—Single 20 amp. fuse mounted below ammeter, behind instrument board.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; STOP and TAIL—1158.

NOTE: This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

CHRYSLER

Model, 66, 6 Cyl., (1930)



BATTERY

Willard, WS-2-15, 6 Volts. Positive Terminal Grounded
Starting Capacity—114 amps. for 20 minutes
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7 1/16, height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-P

Connection to Engine—Mechanical gear shift incorporating overrunning disk clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R. P. M.

Cranking Engine—175 to 180 amps at 4.5 volts.

Lock Torque—12 pound-feet, 475 amps., 3.6 volts

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052

IGNITION

Rotation, R. H., Top View
Delco-Remy, 639-X

Breaker—Contact separation .021 inch

Contact Spring Tension—18 to 20 oz

Timing—Set ignition 26 flywheel degrees before T D C with spark fully advanced

Spark Plugs—Metric (Champion No 10), Gap .027 to .030 inch

Firing Order—1-5-3-6-2-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel)

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	0-2	200	0-1
800	4-6	400	2-3
1200	8-10	600	4-5
1800	12-14	900	6-7
2600	18-20	1300	9-10

Ignition Lock Coil—Delco-Remy, 526-Z.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine. Coil has three "primary" terminals marked "Bat", "Gauge", and "Timer". Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 943-H (Belt Drive)

Performance Data—Gen. cold. (No thermostat used).

Amps.	R.P.M.	Volts
0	680	6.5
3	875	7.
8	1175	7.5
14	1550	8
18	1700 (Max.)	8.2

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—16-18 amps. at 6 volts.

Field Test—4 1/2 to 5 amps. at 6 volts, across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold No 5500-A.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

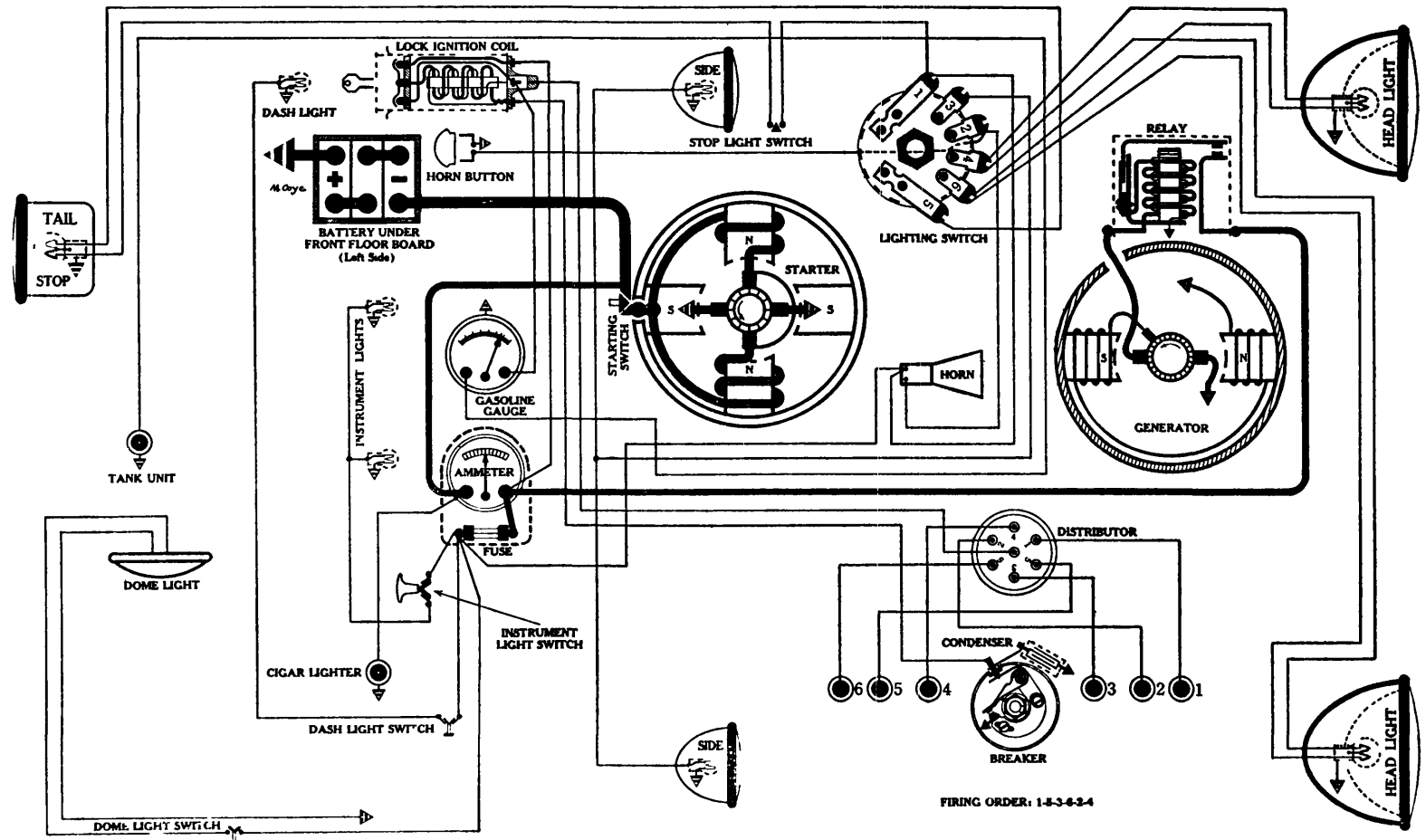
Fuses—Single 20 amp. fuse mounted behind instrument board.

Lamps—See P 3, Sec AA HEAD—1110 (Bifocal); SIDE—63; DOME—63; STOP and TAIL—1158.

NOTE: This is the old style Ford headlight bulb with two filaments. Make sure the 3 C P filament burns for tail light.

CHRYSLER

Model, 70, 6 cyl., (1930)



BATTERY

Willard WS-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7 1/16; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-P

Connection to Engine—Mechanical gear shift incorporating overrunning disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—175 to 180 amps. at 4.5 volts.
Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 820052.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 639-X

Breaker—Contact separation .021 inch.
Contact Spring Tension—18 to 20 oz.
Timing—Set ignition 23 flywheel degrees before T.D.C. with spark fully advanced.
Spark Plugs—Metric (Champion No. 10); Gap .027 to .030 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	0-2	200	0-1
800	4-6	400	2-3
1200	8-10	600	4-5
1800	12-14	900	6-7
2600	18-20	1300	9-10

Lock Ignition Coil—Delco-Remy, 526-T.

NOTE This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat", "Gauge", and "Timer". Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 959-D (Belt Drive)

Performance Data—Gen. cold. No Thermostat.

Amps	RPM	Volts	Amps	RPM	Volts
0	475	6.5	13	1200	7.9
3	600	7.	16	1400 (Max)	8.
7	800	7.2	15	1700	8
10	1000	7.8			

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—15-18 amps. at 6 volts.

Field Test—4 1/2 to 5 amps. at 6 volts across field coils in series.

Brush Spring Tension—24-28 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5500-A.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

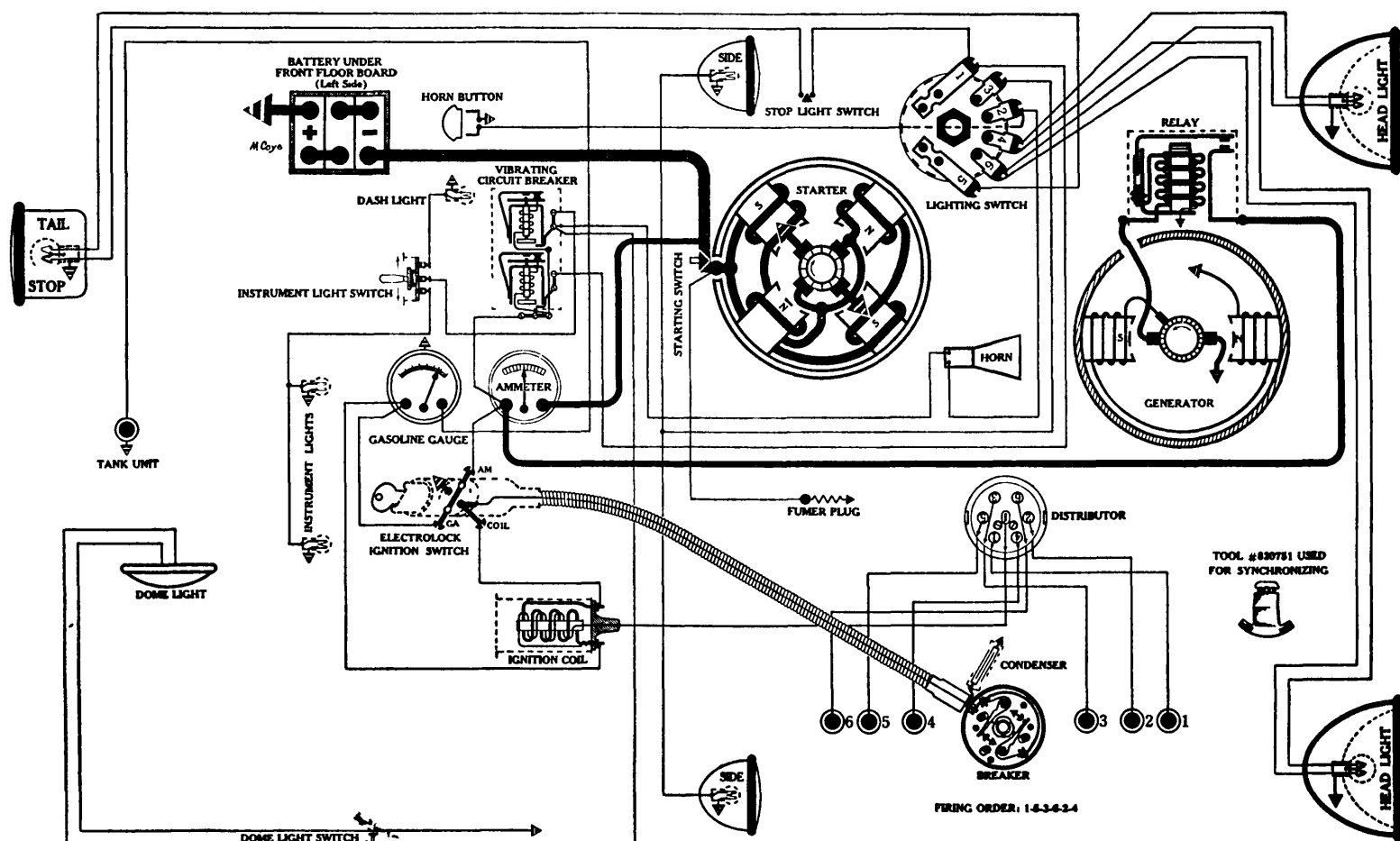
Fuses—Single 20 amp fuse mounted below ammeter, behind instrument board.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DASH—63; DOME—63; STOP and TAIL—1158.

NOTE This is the old style Ford headlight bulb with two filaments. Make sure the 8 C.P. filament burns for tail light.

CHRYSLER

Model, 77, 6 cyl., (1930)



BATTERY

Willard, WS-4-17, 6 Volts. Positive Terminal Grounded
Starting Capacity—130 amps. for 20 minutes.
Lighting Capacity—5 amps. for 23 hours.
Box—Length, 11 11/16; width, 7 1/16; height, 8 3/4 inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 728-B

Connection to Engine—Mechanical Gear Shift incorporating disc clutch Initial movement of gear shifting lever causes pinion to engage flywheel Further movement of lever closes switch on starter. This is a gear reduction job, a pinion being cut on the armature shaft.

Running Free—70 amps. at 5 volts, 2500 R. P. M.

Cranking Engine—150-160 amps. at 4.4 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each

Starting Switch—Delco-Remy, 16210.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 659-E

Breakers—Contact separation .022 inch.

Contact Spring Tension—18 to 20 oz. on each

Timing—Remove 1/8 inch pipe plug from cyl. head above No. 6 Piston, and place gauge rod through hole and in contact with piston head Hand crank engine until No. 6 Piston is coming up on exhaust stroke Stop when .068 inch before T D C, with spark lever fully advanced No. 1 cyl should just fire

Spark Plugs—Metric (Champion No. 10); Gap .027 to .030 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—18 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	0	200	0
800	3	400	1 5
1200	6	600	3
1800	10	900	5
2400	14	1200	7
2800	18	1400	9

Coil—Delco-Remy, 528-E.

Ignition Switch—"Electrolock" Type 9-B For details of construction and instructions on servicing see P. 22, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 959-D (Belt Drive)

Performance Data—Gen. cold			No Thermostat		
Amps	RPM	Volts	Amps	RPM	Volts
0	475	6.5	13	1200	7.9
3	600	7	16	1400 (Max)	8
7	800	7.2	15	1700	8
10	1000	7.8			

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—15-18 amps at 6 volts.

Field Test—4 1/2 to 5 amps. at 6 volts across field coils in series.

Brush Spring Tension—24-28 oz. on each.

Third Brush Adjustment—Loosen cover band See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold No. 5500-A.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

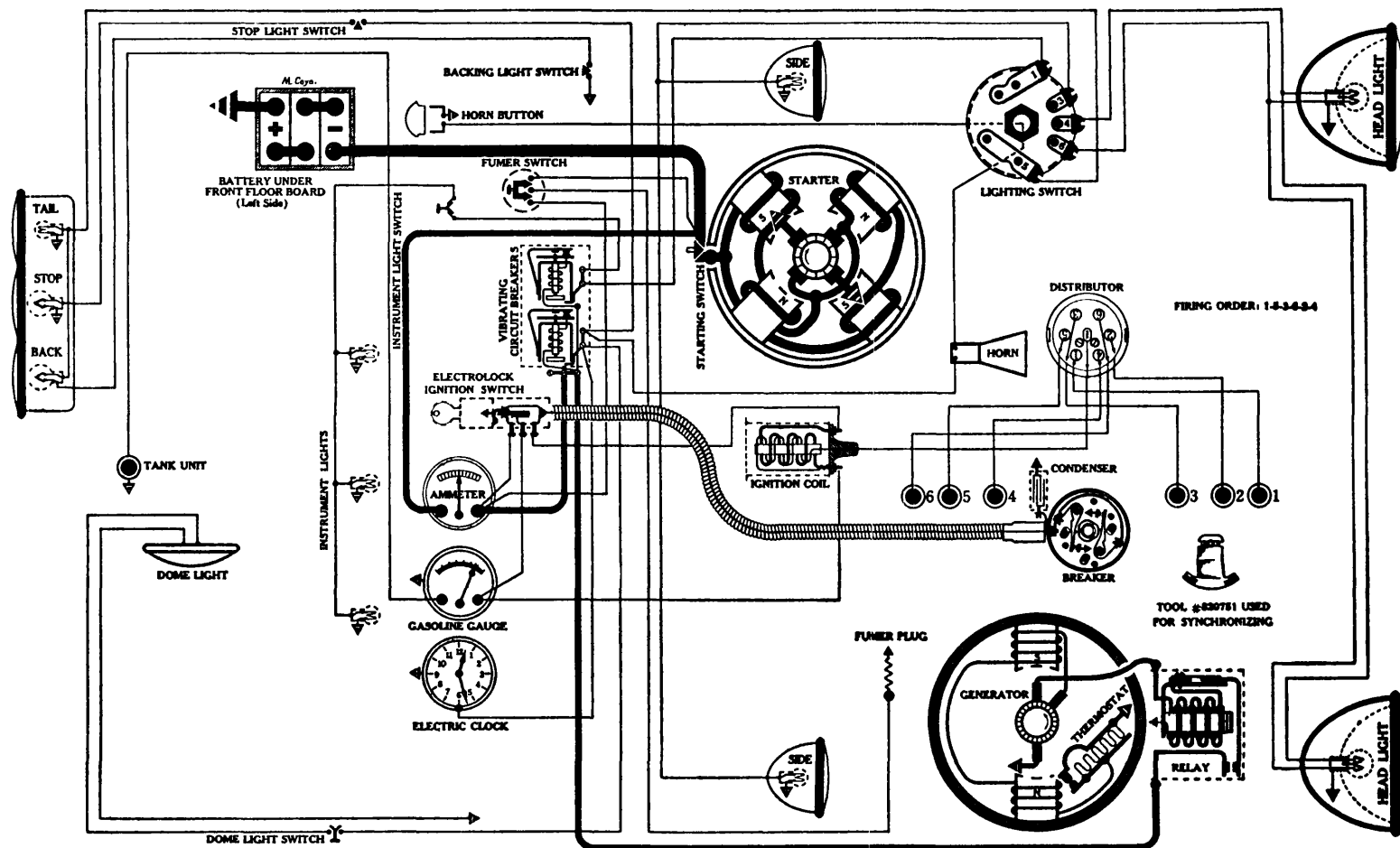
Vibrating Circuit Breakers—Delco-Remy, 410-E; start 25-30 amps. Operate 10-15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; STOP and TAIL—1158; DASH—63.

NOTE This is the old style Ford headlight bulb with two filaments. Make sure the 8 C.P. filament burns for the tail light.

CHRYSLER

Model, 80, 6 cyl., (1930)



BATTERY

Willard SJWR-6, 6 volts. Positive Terminal Grounded

Starting Capacity—166 amps. for 20 minutes.

Lighting Capacity—5 amps. for 30 hours.

Box—Length, 13; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, R. H., Com. End

Delco-Remy, 728-B

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on starter. This is a gear reduction job, a pinion being cut on the armature shaft.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—150-160 amps. at 4.4 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 16210.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 659-B

Breakers—Contact separation .022 inch.

Contact Spring Tension—18 to 20 oz. on each.

Timing—Remove 1/8 inch pipe plug from cyl. head above No. 6 piston, and place gauge rod through hole and in contact with piston head. Hand crank engine until No. 6 piston is coming up on exhaust stroke. Stop when .035 inch before T.D.C., with spark lever fully advanced No. 1 cylinder should just fire.

Spark Plugs—7/8 inch regular (Champion No. 2); Gap .027 to .030 inch.

Firing Order—1-5-3-6-2-4.

Manual Advanc—25 degrees (on Flywheel).

Automatic Advance—24 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400.....	0.....	200.....	0.....
800.....	4.....	400.....	2.....
1500.....	10.....	750.....	5.....
2500.....	20.....	1250.....	10.....
3000.....	24.....	1500.....	12.....

Coil—Delco-Remy, 528-E.

Ignition Switch—“Electrolock”, type B. For theory of operation and instructions on servicing, see P. 18, Sec. AA.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 949-Q

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0.....	575.....	6.5	15.....	1200.....	8.1
3.....	700.....	7.....	20.....	1450 (Max.) ..	8.3
6.....	800.....	7.1	19.....	1700.....	8.3
11.....	1000.....	7.9			

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4.75-5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts clos d.

LIGHTING

Switch—Clum No. 10738.

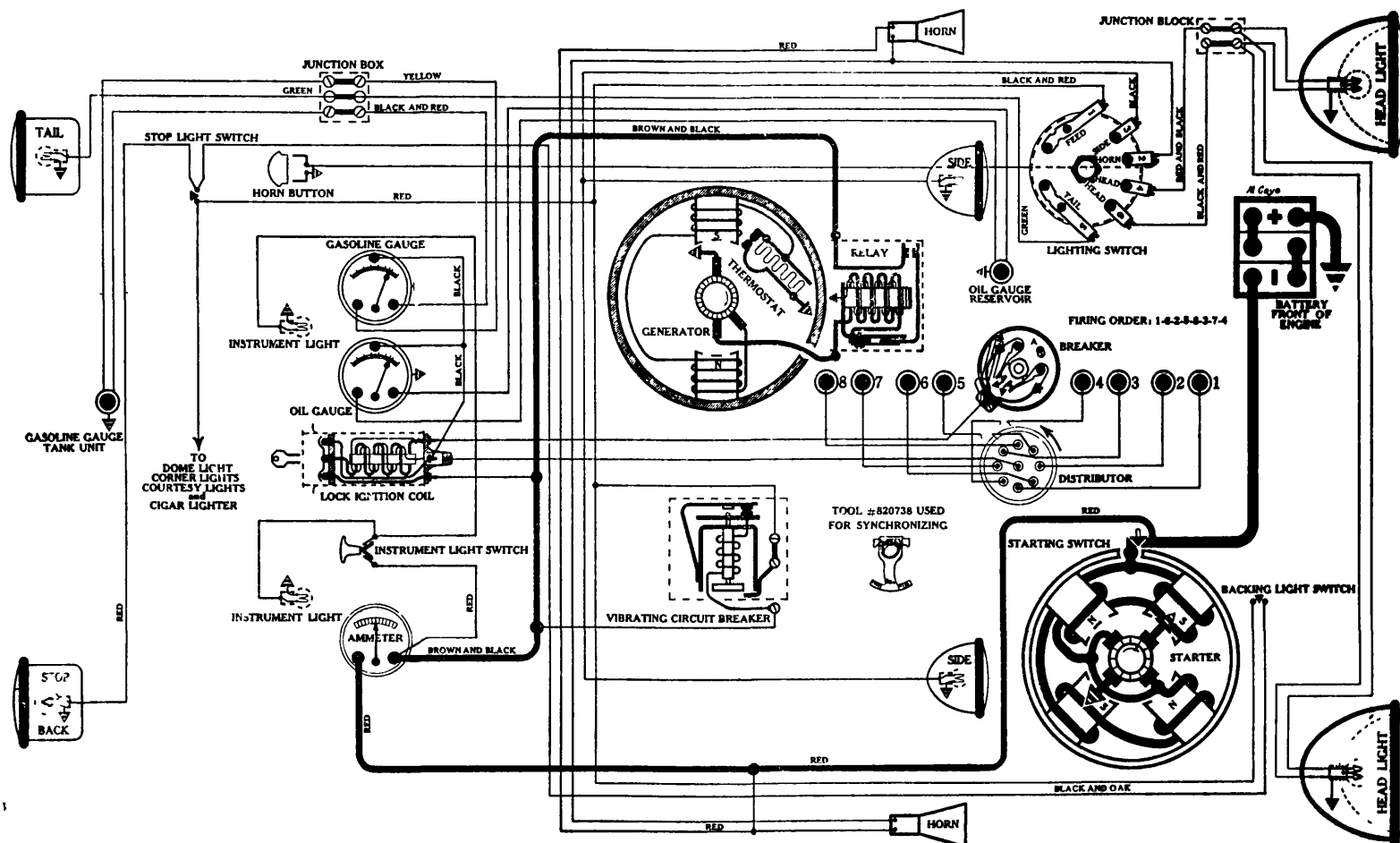
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breakers—Delco-Remy, 410-E. Start 25-30 amps. Operate 10-15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63; BACK—87.

CORD

Model, L-29, Straight Eight, (1930)



BATTERY

U. S. L., XY-15-X-6, 6 volts. Positive terminal grounded
Starting Capacity—119 amps. for 20 minutes.
Lighting Capacity—5 amps. for 21 hours.
Box—Length, 10 7/16; width, 7 1/4; height, 9 1/4 inches.

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 724-N

Connection to Engine—Bendix drive.

NOTE Gear reduction starter A pinion cut on the armature shaft drives a gear on bendix shaft

Running Free—70 amps. at 5 volts, 3500 R. P. M.

Cranking Engine—150 to 170 amps. at 4.6 volts.

Lock Torque—22 pound-feet, 600 amps., 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 16210.

IGNITION

Rotation, L. H., Top View
 Delco-Remy, 658-W

Break rs—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Timing—Set ignition 13 flywheel degrees before T.D.C. with spark fully advanced.

Spark Plugs—Metric (Champion No. 10); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—17 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist. RPM	Degrees Advance (on cam)
800	0	400	0
1200	2	600	1
1800	6	900	3
2400	10	1200	5
3000	14	1500	7
3600	17	1800	8 5

Ignition Lock Coil—Delco-Remy, 526-V.

Note This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.", "Gauge", and "Timer". Coil must be connected as marked

GENERATOR

Rotation, R. H., Com. End
 Delco-Remy, 941-T

Performance Data—Gen. cold. Thermostat closed.

Amps	RPM	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE Thermostat opens about 165° F, reducing charging rate approx. 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—16-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 266-P

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5650-A.

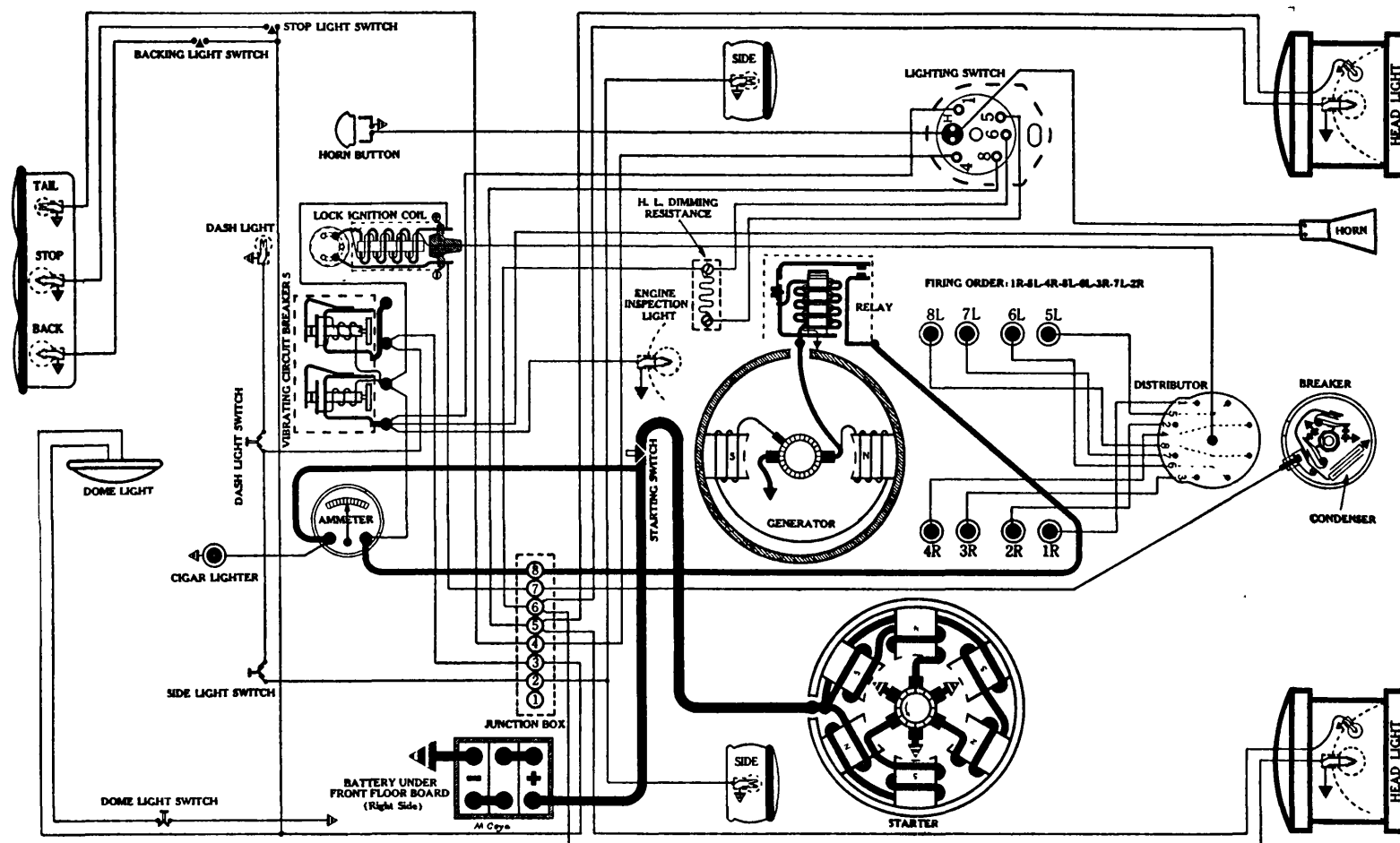
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; STOP—87; TAIL—63; INSTRUMENT—63.

CUNNINGHAM

Model, V-9, (1930)



BATTERY

Willard, SJRR-5, 6 volts. Negative Terminal Grounded
Starting Capacity—145 amps. for 20 minutes.
Lighting Capacity—5 amps. for 26½ hours.
Box—Length, 11 11/16; width, 7¼; height, 9 13/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 350

Connection to Engine—Bendix drive.
Running Free—55 amps. at 6 volts, 4000 R.P.M.
Cranking Engine—245-260 amps. at 4.1 volts.
Lock Torque—21½ pound-feet, 475 amps. at 3 volts.
Brush Spring Tension—24 to 26 oz. on each.

IGNITION

Rotation, R. H., Top View
North East, Model TEU, Type 10874

IMPORTANT NOTE: This unit uses an eight lobe cam with two sets of breaker arms connected in parallel. They operate simultaneously, and no provision is made for synchronizing.

Breakers—Contact separation .020 inch.

Contact Spring Tension—18-22 oz. on each.

Timing—With No. 1 Piston on T.D.C. compression stroke, spark lever fully advanced, rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.

Firing Order—1R-5L-4R-8L-6L-3R-7L-2R.

Spark Plugs—7/8 inch regular (Champion No. 2); Gap .025 inch.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—21 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	0	200	0
800	3	400	1.5
1600	8	800	4
2000	11	1000	5.5
2400	14	1200	7
3000	18	1500	9
3400	21	1700	10.5

Lock Ignition Coil—North East, Type 5023660.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, R. H., Com. End
Delco-Remy, 285

Performance Data—Gen. hot; add 3 amps. for cold test.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	550	6.5	16	1400	8.
3	600	7.	18-20	1000	8.4
10	900	7.6	Average 13		

Motoring Freely—4½-6 amps. at 6 volts.

Max. Stall Current—17-19 amps. at 6 volts.

Field Test—2.75-3 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 9, P. 6, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-D.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

Circuit Breakers—Delco-Remy, 5759.

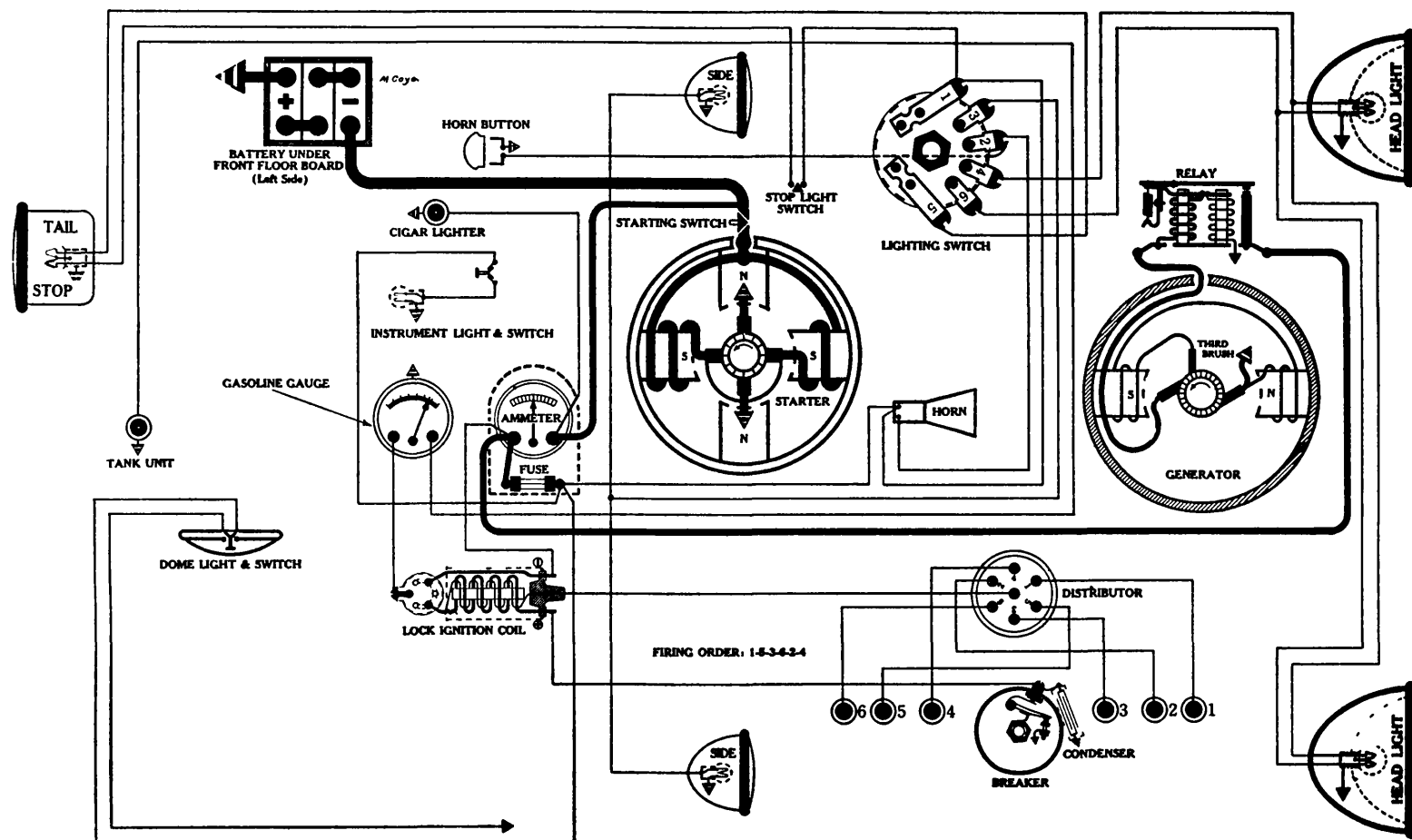
Vibrating—Starts 25 to 30 amps. Operates 10 to 15.

Lockout—Starts 25 to 30 amps. Operates with discharge less than 1 amp.

Lamps—See P. 3, Sec. AA. HEAD—1129; AUX.—63; SIDE—63; INSTRUMENT—63; ENGINE INSPECTION—1129; TAIL—63; STOP—1129; BACK—1129; DOME—64.

DESOTO

Model, 6 Cyl., (1930)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded
 Starting Capacity—98 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 17 hours.
 Box—Length, 9 1/16; width 7 1/16; height, 8 7/8 inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 714-Q

Connection to Engine—Mechanical gear shift incorporating overrunning disk clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.
 Cranking Engine—160 to 180 amps. at 4.2 volts.
 Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.
 Brush Spring Tension—24 to 28 oz. on each.
 Starting Switch—Delco-Remy, 820052.

IGNITION

Rotation, R. H., Top View
 North East, Model TBU, Type 10849

Breaker—Contact separation .020 inch.
 Contact Spring Tension—18 to 20 oz.
 Timing—Set ignition 23 flywheel degrees before T.D.C. with spark fully advanced.
 Spark Plugs—Metric (AC Type G-11); Gap .025 inch.
 Firing Order—1-5-3-6-2-4.
 Manual Advance—25 degrees (on Flywheel).
 Automatic Advance—16 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
600	0	300	0
800	4	400	2
1200	6	600	3
1800	12	900	6
2200	16	1100	8

Lock Ignition Coil—North East, Type 21998.

Note: This unit is a combined ignition switch and coil. Impossible to 'jump out' ignition switch with wire to run engine.

GENERATOR

Rotation, L. H., Com. End

North East, Model LAB, Type 6530 (Belt Drive)

Performance Data—Gen. cold.

Amps	RPM	Volts	Amps	RPM	Volts
0	750	6.5	15	1400	8
5.5	1000	7.2	18.5	1800	8.2
11	1200	7.9	19	2000 (Max)	8.3

Motoring Freely—4 to 5 amps. at 6 volts
 Max. Stall Current—21 to 23 amps. at 6 volts
 Field Test—3 amps. at 6 volts, across field coils in series
 Brush Spring Tension—12 to 16 oz. on each
 Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

North East, Type 20220

Closes—7 to 7 1/2 volts
 Opens—0 to 2 amps. discharge.
 Contact Gap—.020 to .025 inch.
 Core Gap—.015 inch, contacts closed

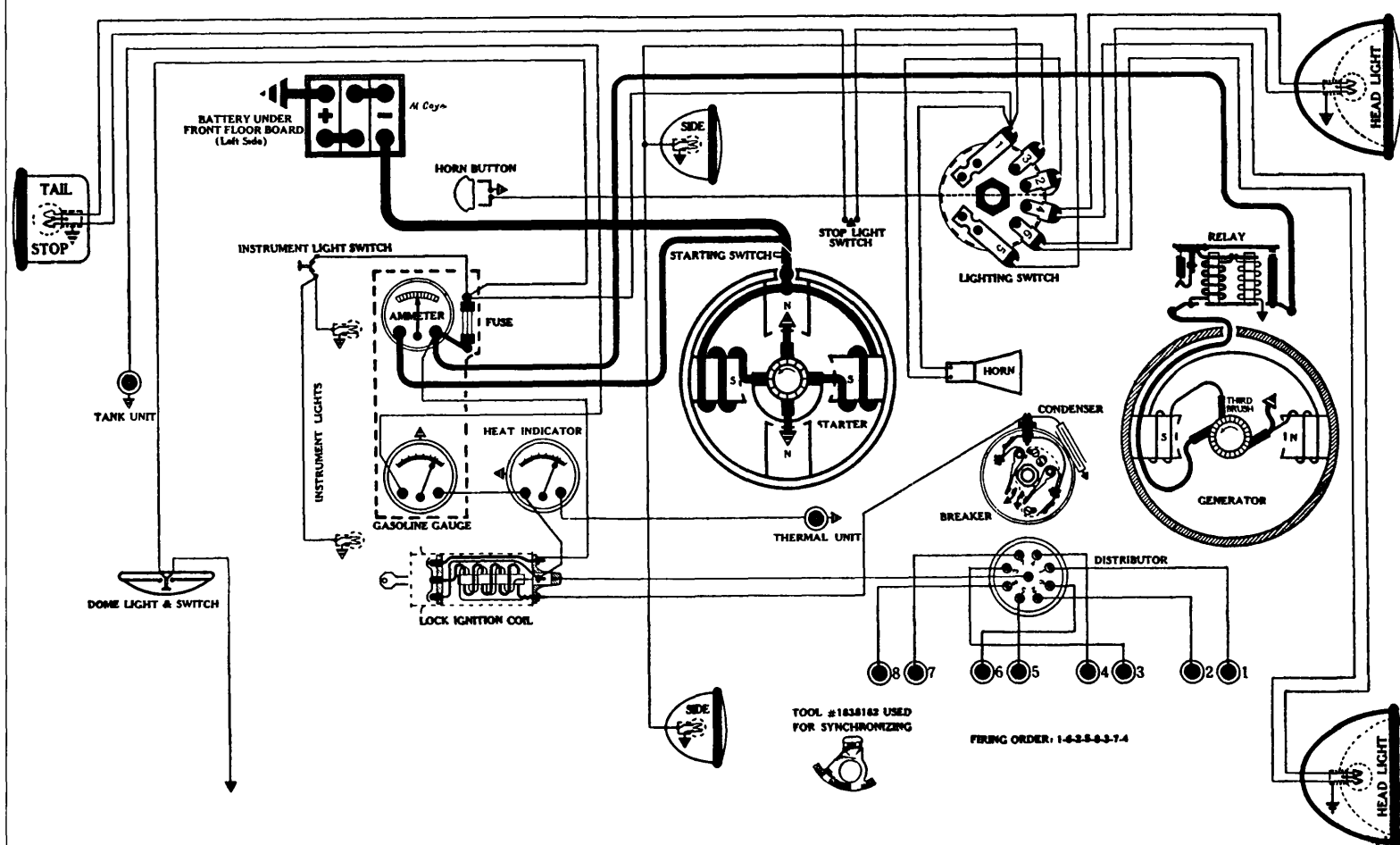
LIGHTING

Switch—Soreng-Manegold, No. 5500-A.
 Location—Foot of steering column. Lights controlled by lever on steering wheel.
 Fuses—Single 20 amp. fus. mounted below ammeter behind instrument board.
 Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; DOME—63; STOP and TAIL—1158

NOTE: This is the old style Ford headlight bulb with two filaments. Make sure the 3 C P filament burns for tail light.

DE SOTO

Model, Straight Eight, (1930)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7 1/16; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-Q

Connection to Engine—Mechanical gear shift incorporating overrunning disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—160 to 180 amps. at 4.2 volts.
Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 820052.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 660-D

IMPORTANT NOTE: The 660 series of D.R. Distributors is new in 1930. A special new synchronizing tool has been developed for making adjustments. For detailed instructions in synchronizing see P. 32, Sec. AA.

Breakers—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz. on each.
Timing—Remove 1/8 inch pipe plug from cyl. head above No. 8 Pist n, and place gauge rod through hole and in contact with piston head. Hand crank engine until No. 8 Piston is coming up on exhaust stroke. Stop when .037 inch before T.D.C. With spark fully advanced No. 1 cyl. should just fire.
Spark Plugs—Metric (AC Typ G-11); Gap .027 to .030 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—23 degrees (on Flywheel).
Automatic Advance—14 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
1000.....	0.....	500.....	0.....
1500.....	4.....	750.....	2.....
2000.....	8.....	1000.....	4.....
2500.....	12.....	1250.....	6.....
2800.....	14.....	1400.....	7.....

Lock Ignition Coil—Delco-Remy, 526-N.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.", "Gauge", and "Timer". Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

North East, Model LAB, Type 6530 (B lt Driv)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0.....	750.....	6.5.....	15.....	1400.....	8.....
5.5.....	1000.....	7.2.....	18.5.....	1800.....	8.2.....
11.....	1200.....	7.9.....	19.....	2000 (Max.).....	8.3.....

Motoring Freely—4 to 5 amps. at 6 volts.

Max. Stall Current—21 to 23 amps. at 6 volts.

Field Test—3 amps. at 6 volts, across field coils in series.

Brush Spring Tension—12 to 16 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

North East, Type 20220

Closes—7 to 7 1/2 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.020 to .025 inch.

Core Gap—.015 inch, contacts closed.

LIGHTING

Switch—Soreng-Man g ld No. 5500-A.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

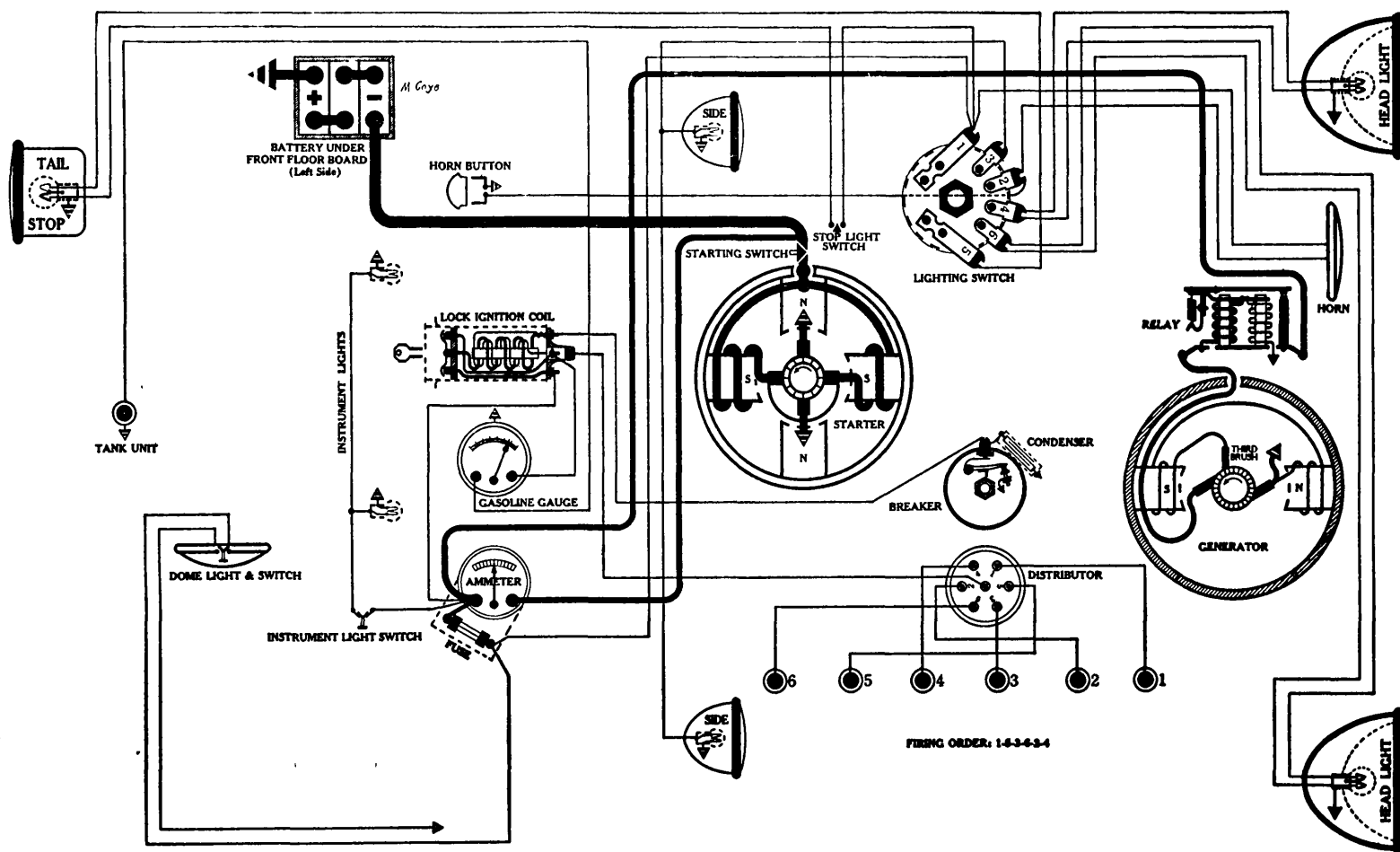
Fuses—Single 20 amp. fus mounted beside ammeter behind instrument board.

Lamps—See P. 3, Sec. AA. **HEAD**—1110 (Bifocal); **SIDE**—63; **INSTRUMENT**—63; **DOME**—63; **STOP and TAIL**—1158.

NOTE: This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for the tail light.

DODGE

Model, DD, 6 Cyl., (1930)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17 hours.
Box—Length, 9 1/16; width 7 1/16; height, 8 7/8 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-Q

Connection to Engine—Mechanical gear shift incorporating overrunning disk clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—160 to 180 amps. at 4.2 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

IGNITION

Rotation, R. H., Top View
North East, Model TBU, Type 10849

Breaker—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz.

Timing—Set ignition 23 flywheel degrees before T.D.C. with spark fully advanced.

Spark Plugs—Metric (AC Type G-11); Gap .025 inch.

Firing Ord r—1-5-3-6-2-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600.....	0.....	300.....	0.....
800.....	4.....	400.....	2.....
1200.....	6.....	600.....	3.....
1800.....	12.....	900.....	6.....
2200.....	16.....	1100.....	8.....

Lock Ignition Coil—Delco-Remy, 526-L.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.", "Gauge", and "Timer". Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

North East, Model LAB, Type 6530 (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0.....	750.....	6.5.....	15.....	1400.....	8.....
5.5.....	1000.....	7.2.....	18.5.....	1800.....	8.2.....
11.....	1200.....	7.9.....	19.....	2000 (Max.).....	8.3.....

Motoring Freely—4 to 5 amps. at 6 volts.

Max. Stall Current—21 to 23 amps. at 6 volts.

Field Test—3 amps. at 6 volts, across field coils in series.

Brush Spring Tension—12 to 16 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

North East, Type 20220

Closes—7 to 7 1/2 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.020 to .025 inch.

Core Gap—.015 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegoid, No. 5500-A.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

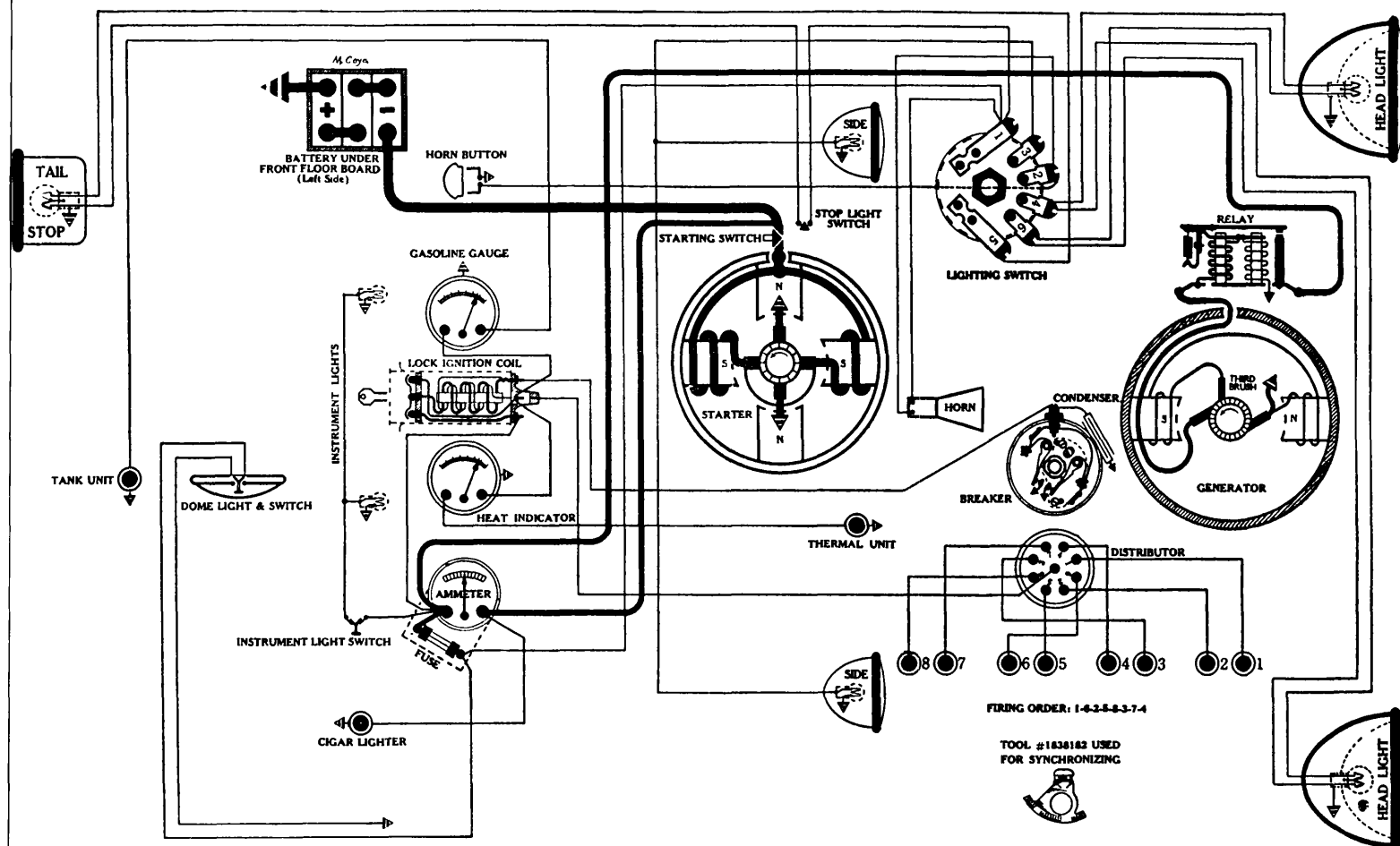
Fuses—Single 20 amp. fus mounted below ammeter behind instrument board.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; DOME—63; STOP and TAIL—1158.

NOTE: This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

DODGE

Mod I, DC, Straight Eight, (1930)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded

Starting Capacity—114 amps. for 20 minutes.

Lighting Capacity—5 amps. for 20 hours.

Box—Length, 10 5/16; width, 7 1/16; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 714-Q

Connection to Engine—Mechanical gear shift incorporating overrunning disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—160 to 180 amps. at 4.2 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 660-B

IMPORTANT NOTE: The 660 series of D.R. Distributors is new in 1930. A special new synchronizing tool has been developed for making adjustments. For detailed instructions in synchronizing see P. 32, Sec. AA.

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Timing—Remove 1/8 inch pipe plug from cyl. head above No. 8 Piston, and place gauge rod through hole and in contact with piston head. Hand crank engine until No. 8 Piston is coming up on exhaust stroke. Stop when .040 inch before T.D.C. With spark fully advanced No. 1 cyl. should just fire.

Spark Plugs—Metric (AC type G-10); Gap .022 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—23 degrees (on Flywheel).

Automatic Advance—14 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
1000.....	0.....	500.....	0.....
1500.....	4.....	750.....	2.....
2000.....	8.....	1000.....	4.....
2500.....	12.....	1250.....	6.....
2800.....	14.....	1400.....	7.....

Lock Ignition Coil—Delco-Remy, 526-N.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.", "Gauge", and "Timer". Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

North East, Model LAB, Type 6530 (Belt Driv)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0.....	750.....	6.5.....	15.....	1400.....	8.....
5.5.....	1000.....	7.2.....	18.5.....	1800.....	8.2.....
11.....	1200.....	7.9.....	19.....	2000 (Max.).....	8.3.....

Motoring Freely—4 to 5 amps. at 6 volts.

Max. Stall Current—21 to 23 amps. at 6 volts.

Field Test—3 amps. at 6 volts, across field coils in series.

Brush Spring Tension—12 to 16 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

North East, Type 20220

Closes—7 to 7 1/2 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.020 to .025 inch.

Core Gap—.015 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold No. 5500-A.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

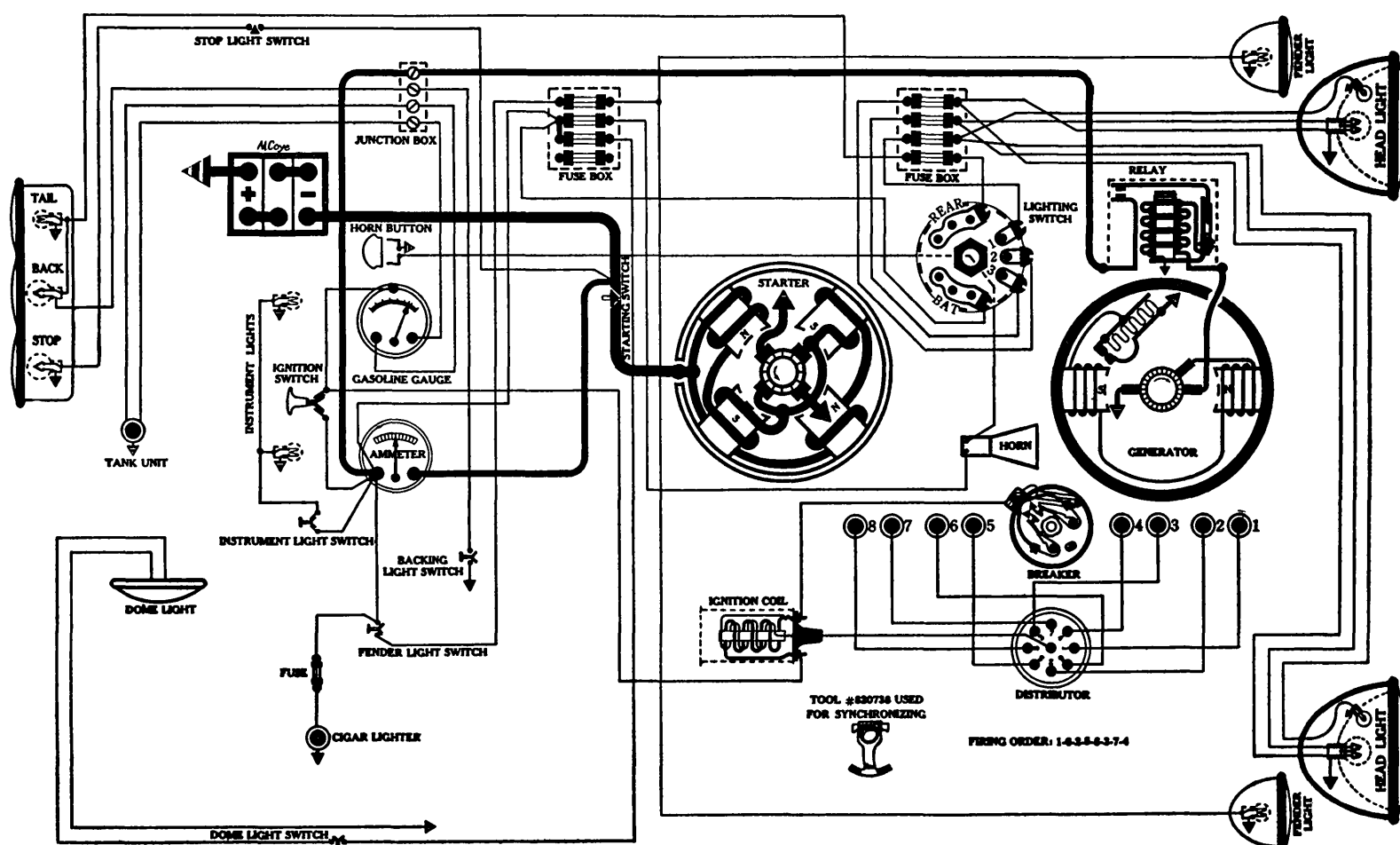
Fuses—Single 20 amp. fuse mounted beside ammeter behind instrument board.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; STOP and TAIL—1158.

NOTE: This is the old style Ford headlight bulb with two filaments. Make sure the 8 C.P. filament burns for tail light.

DUPONT

Model, G, Straight Eight, (1930)



BATTERY

Exid , 3-XC-17-1, 6 volts. Positive Terminal Grounded
 Starting Capacity—130 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 32 hours.
 Box—Length, 11 5/16; width, 7 5/32; height, 9 5/32 inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 720-X

Connection to Engine—Bendix drive.
 Running Free—65 amps. at 5 volts, 6000 R.P.M.
 Cranking Engine—185-190 amps. at 4.1 volts.
 Lock Torque—15 pound-feet, 570 amps., 3.1 volts.
 Brush Spring Tension—24-28 oz. on each.
 Starting Switch—Delco-Remy, 406-A.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 658-A

Break rs—Contact separation .022 inch.
 Contact Spring Tension—18 to 20 oz. on each.
 Timing—With No. 1 Piston on T.D.C., power stroke, fly-wheel mark "No 1 TDC" opposite pointer, spark fully retarded, rotor opposite No 1 Dist Cap Terminal, breaker points should just open
 Firing Ord r—1-6-2-5-8-3-7-4.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—15 degrees (on Flywheel).

Eng RPM	Degre s Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
300	0 0	150	0-0
1000	2 5-6 5	500	1 -3
1800	13 17	900	6 5-8 5

Coil—Delco-R my, 525-C.

GENERATOR

Rotation, R. H., Com. End

Delco-Remy, 945-U

Performance Data—Gen. cold. Thermostat closed.

Amps	R P M	Volts	Amps	R P M	Volts
0	500	6.5	12	1000	7 8
4	700	7.	16	1200	8
8	800	7 2	19	1300 (Max)	8 3

NOTE Thermostat opens about 16.° F reducing charging rate approx 30 40%

Motoring Freely—5-5½ amps at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4½ to 5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 360-A.

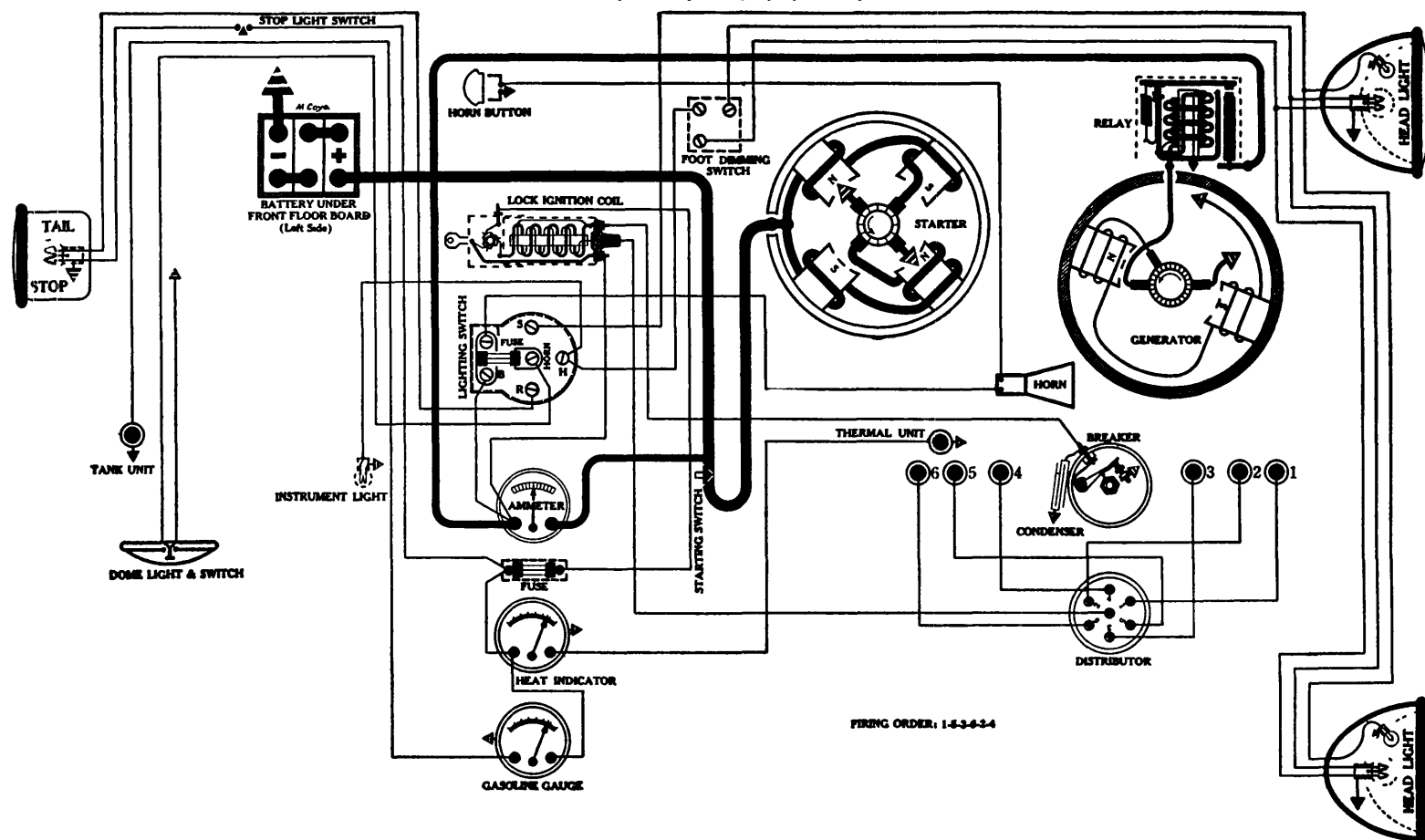
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—20 amp. fuses in fuse boxes.

Lamps—See P. 3, Sec. AA. HEAD—1110, (Bifocal); FENDER—63; INSTRUMENT—63; STOP—1129, BACK—1129; TAIL—63, AUX.—63.

DURANT

Model, 6-14, 6 cyl., (1930)



BATTERY

U. S. L., 3-CVX-6X-7A, 6 volts. Negative Terminal Grounded

Starting Capacity—115 amps. for 20 minutes.

Lighting Capacity—5 amps for 21 hours

Box—Length, 10 7/16; width, 7 7/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAJ-4001

Connection to Engine—Bendix drive.

Running Free—50 amps. at 5.5 volts.

Cranking Engine—160 amps. at 5.25 volts, 228 R P.M

Lock Torque—13.6 pound-feet, 540 amps, 3 volts.

Brush Spring Tension—20 to 24 oz. on each.

Starting Switch—Auto-Lite, SW-4003.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGB-4031

Breaker—Contact separation .020 inch.

Contact Spring Tension—17 to 19 oz.

Timing—With No. 1 Piston on T.D.C., power stroke, spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal; breaker points should just open.

Spark Plugs—Metric (AC Type G-10); Gap .025 inch

Firing Order—1-5-3-6-2-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—24 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
600	0	300	0
1200	9	600	4.5
1600	15	800	7.5
2000	21	1000	10.5
2200	24	1100	12

Lock Ignition Coil—Auto-Lite, IG-4082.

NOTE This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4130 (Belt Drive)

Performance Data—Gen cold.

Amps	RPM	Volts	Amps	RPM	Volts
0	510	6.5	10	960	7.5
4	680	6.9	14	1450	8.2

Maximum Charging Rate—16 amps. at 8 volts, or 15 amps. at 7.5 volts.

Motoring Freely—5 amps. at 6 volts.

Max. Stall Current—18.5 amps. at 6 volts.

Field Test—4 1/2 amps. at 6 volts directly across field coils in series.

Field Fuse—None.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7.5 volts

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch

Core Gap—.010 to .012 inch, contacts clos d.

LIGHTING

Switch—Clum No. 10741.

Location—Behind instrument board. Operated by pull knob.

Fuse—20 amp fuse mounted on switch back, for lights.

Single 20 amp. fuse on block for stop light, heat and gasoline indicators.

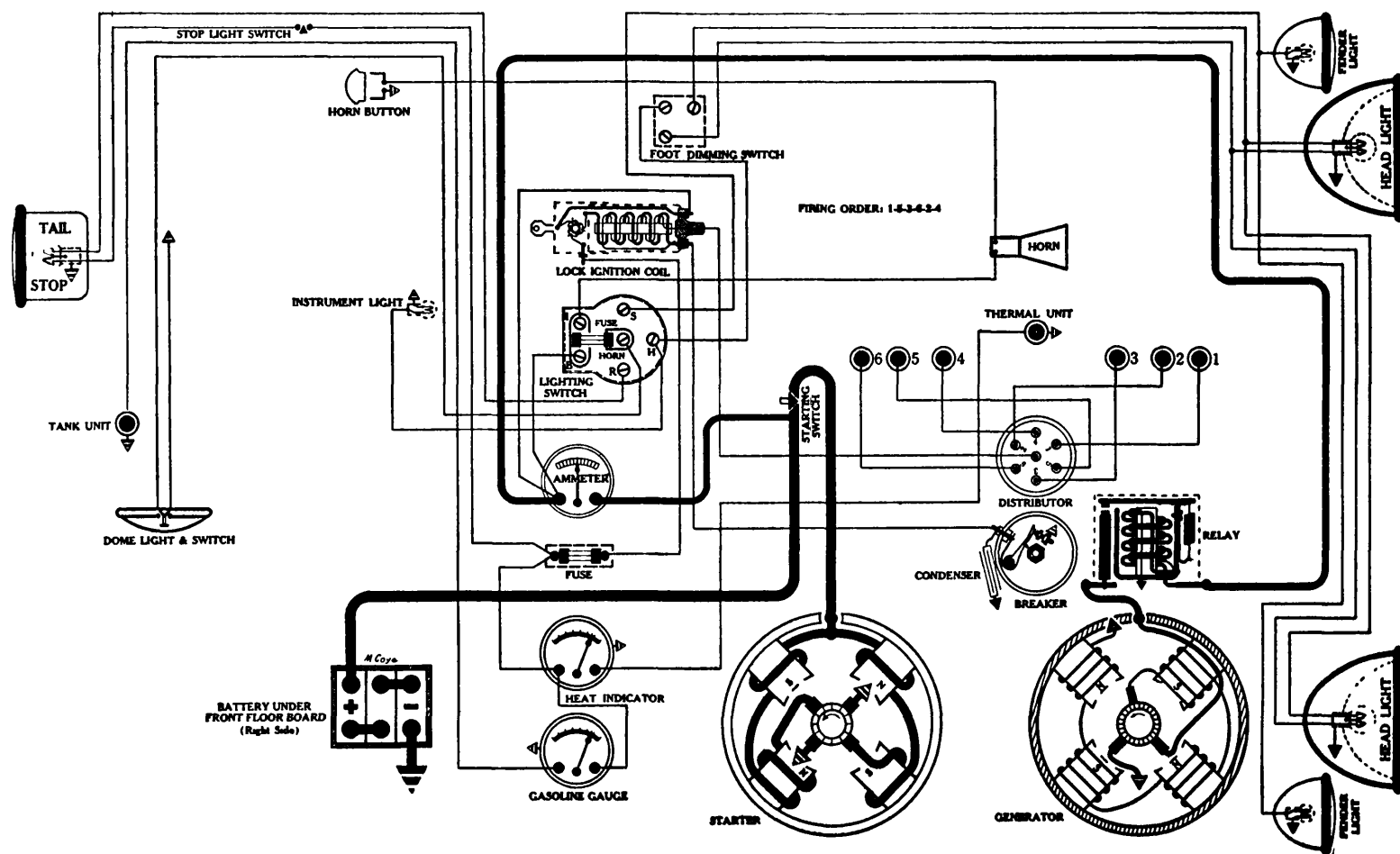
Foot Dimming Switch—On toe board (left side), tilt beam controlled by pressing foot plunger.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX—63; INSTRUMENT—63; DOME—63; STOP and TAIL—1158.

NOTE This is the old style Ford headlight bulb with two filaments. Make sure the 3 CP filament burns for tail light.

DURANT

Model, 6-17, 6 Cyl., (1930)



BATTERY

U. S. L., 3-HVX-6X-6A, 6 volts. Negative Terminal Grounded

Starting Capacity—127 amps. for 20 minutes.

Lighting Capacity—5 amps. for 23½ hours.

Box—Length, 10 7/16; width, 7 7/16; height, 9¾ inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAD-4101

Connection to Engine—Bendix drive.

Running Free—50 amps. at 5½ volts.

Cranking Engine—160 amps. at 5.25 volts, 228 R.P.M.

Lock Torque—13.6 pound-feet, 540 amps., 3 volts.

Brush Swing Tension—20 to 24 oz. on each.

Starting Switch—Auto-Lite, SW-4003.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGB-4036-A

Breaker—Contact separation .020 inch

Contact Spring Tension—17 to 19 oz.

Timing—With No. 1 Piston on T.D.C., power stroke, rotor opposite No. 1 Dist. Cap Terminal; breaker points should just open.

Spark Plugs—Metric (AC Type G-10); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—24 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
600	0	300	0
1000	5	500	2.5
1400	10	700	5
2000	17	1000	8.5
2400	22	1200	11
2600	24	1300	12

Lock Ignition Coil—Auto-Lite, IG-4082.

NOTE This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAK-4101 or GAK-4103

Performance Data—Gen. cold.

Amps	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	425	6.5	13	700	7.9
2	450	6.7	15	1000	8.
5	500	7.1	18	1250 (Max.)	8.2
10	625	7.8			

Motoring Freely—5-5½ amps. at 6 volts.

Max. Stall Current—17-19 amps. at 6 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Field Fuse—7½ amps. (Not shown on diagram).

Brush Spring Tension—1¼-1½ lbs. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4007

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Clum No. 10741.

Location—Behind instrument board. Operated by pull knob.

Fuse—20 amp. fuse mounted on switch back, for lights.

Single 20 amp. fuse on block for stop light, heat and gasoline indicators.

Foot Dimming Switch—On toe board (left side), tilt beam controlled by pressing foot plunger.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal);

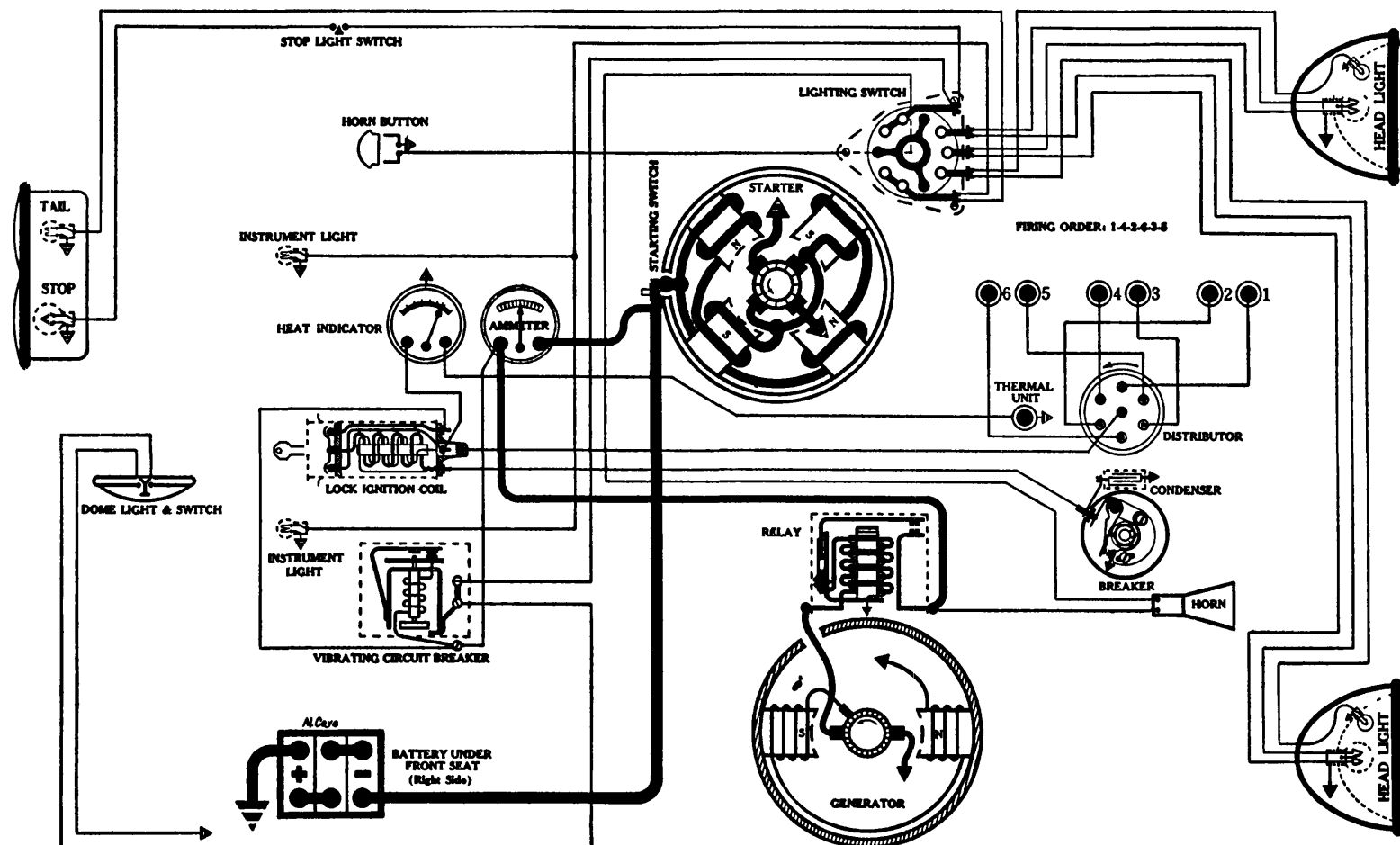
FENDER—63; INSTRUMENT—63; DOME—63;

STOP and TAIL—1158.

NOTE This is the old style Ford headlight bulb with two filaments. Make sure the 3 C P filament burns for the tail light.

ERSKINE

Model, 53, 6 cyl., (1930)



BATTERY

Willard, WJ-1-11, 6 volts. Positive Terminal Grounded
Starting Capacity—104 amps. for 20 minutes.
Lighting Capacity—5 amps. for 18 hours.
Box—Length, 9 1/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 724-L

Connection to Engine—Bendix drive.
Running Free—70 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—160-170 amps. at 4.6 volts.
Lock Torque—11 pound-feet, 450 amps., 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 1837455. Mounted on starter. Operated by pull cable from instrument board.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 639-J

Breaker—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz.
Timing—With No. 1 Piston on compression stroke bring flywheel punch marks (found 3/4 inch before flywheel "UDC 1-6" mark) opposite pointer, spark fully advanced, rotor opposite No. 1 Dist Cap Terminal, breaker points should just open.
Spark Plugs—7/8 inch Long Body (Champion No. 4); Gap .025 inch.

Firing Order—1-4-2-6-3-5.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—28 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	0-1	200	0-5
800	6-8	400	3-4
1200	12-14	600	6-7
1800	18-20	900	9-10
2400	22-24	1200	11-12
2800	26-28	1400	13-14

Lock Ignition Coil—Delco-Remy, 526-Q.

NOTE This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat", "Gauge", and "Timer". Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-U

Performance Data—Gen. cold.			No thermostat.		
Amps	RPM	Volts	Amps	RPM	Volts
0	575	6.5	14	1400	7.9
5	800	7.1	16	1600 (Max)	8.
9	1000	7.5	15	1800	8.
12	1200	7.8			

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—15-17 amps. at 6 volts.

Field Test—475-5 amps. at 6 volts across field coils in series.

Brush Spring Tension—16-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-E.

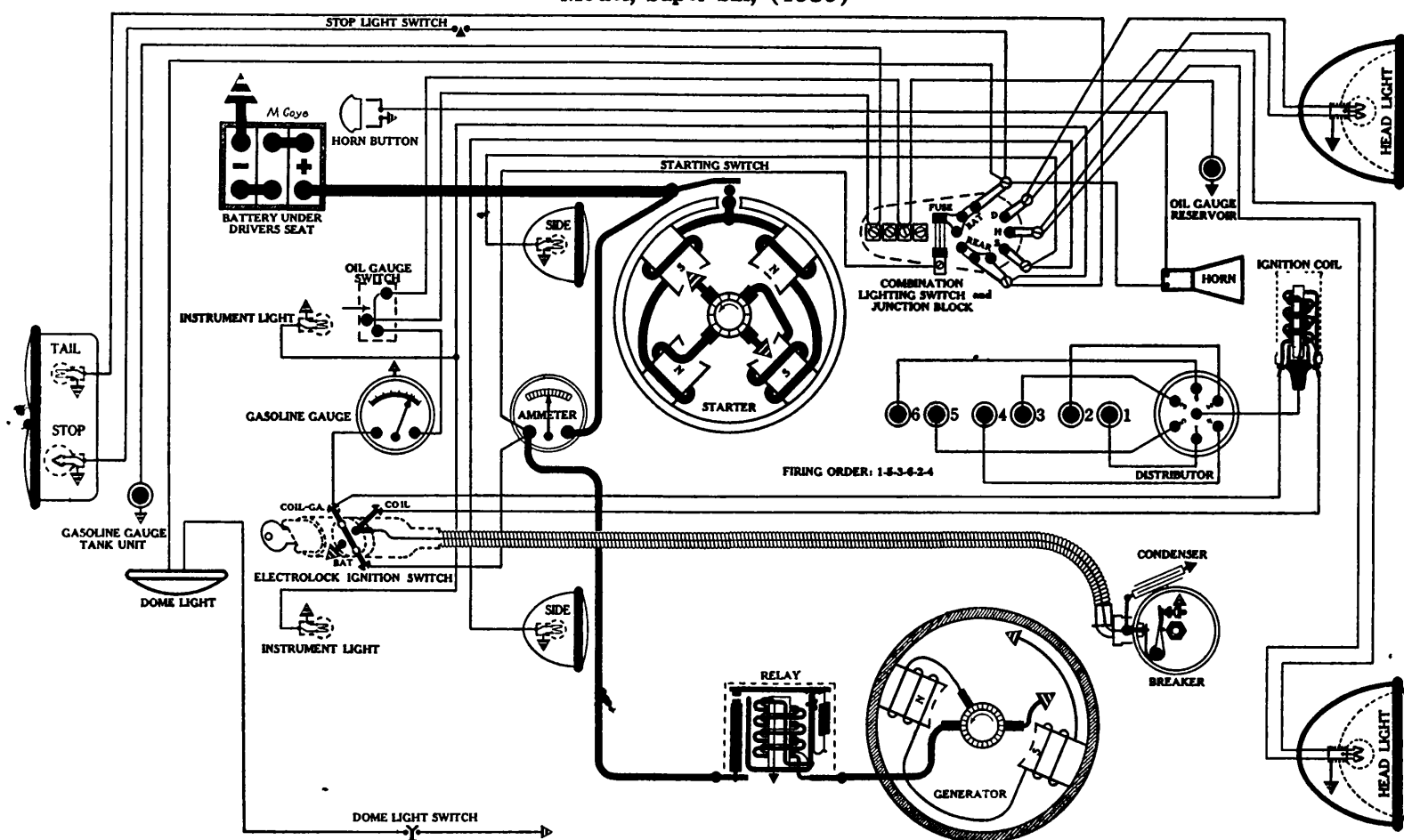
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-F. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110, (Bifocal); AUX.—63, INSTRUMENT—63; TAIL—63; DOME—81; STOP—87.

ESSEX

Model, Super Six, (1930)



BATTERY

Exide, 3-X1-13-1-G, 6 volts. Negative Terminal Grounded
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—5 amps. for 16½ hours.
Box—Length, 9; width, 7⅞; height, 9 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MZ-4017

Connection to Engine—Bendix drive.
Running Free—70 amps. at 6 volts.
Cranking Engine—160-170 amps. at 4.5 volts.
Lock Torque—12 pound-feet, 525 amps., 3.75 volts
Brush Spring Tension—24-28 oz. on each.
Starting Switch—Mounted on starter. Operated by pull cable from instrument board.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGB-4030 or IGB-4033
(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
Contact Spring Tension—17 to 19 oz.
Timing—With No. 1 Piston on T.D.C., power stroke, fly-wheel mark "UDC, 1-6" opposite pointer, rotor opposite No. 1 Dist. Cap Terminal; breaker points should just open
Spark Plugs—Metric (AC Type G-10); Gap .022 inch.
Firing Order—1-5-3-6-2-4.

Automatic Advance—20 degrees (on Flywheel)

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
800	0	400	0
1200	2	600	1
2000	8	1000	4
2800	12	1400	6
3600	18	1800	9
4000 (Max)	20	2000	10

Coil—Auto-Lite, IG-4081.

Switch—"Electrolock", type 9-B. For details of operation and instructions on servicing see P. 22, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAM-4102

Performance Data—Gen. cold.

Amps	RPM.	Volts	Amps.	RPM	Volts
0	550	6.5	14	950	7.9
2	600	6.9	16	1100	8
5	650	7.1	17	1350 (Max)	8
10	800	7.8			

Motoring Freely—4½-5½ amps. at 6 volts.

Max. Stall Current—18-19 amps. at 6 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Brush Spring Tension—22 to 25 oz. on main; 30 to 34 oz. on third.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4016

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold No. 8000-A. (Combination lighting switch and junction block.)

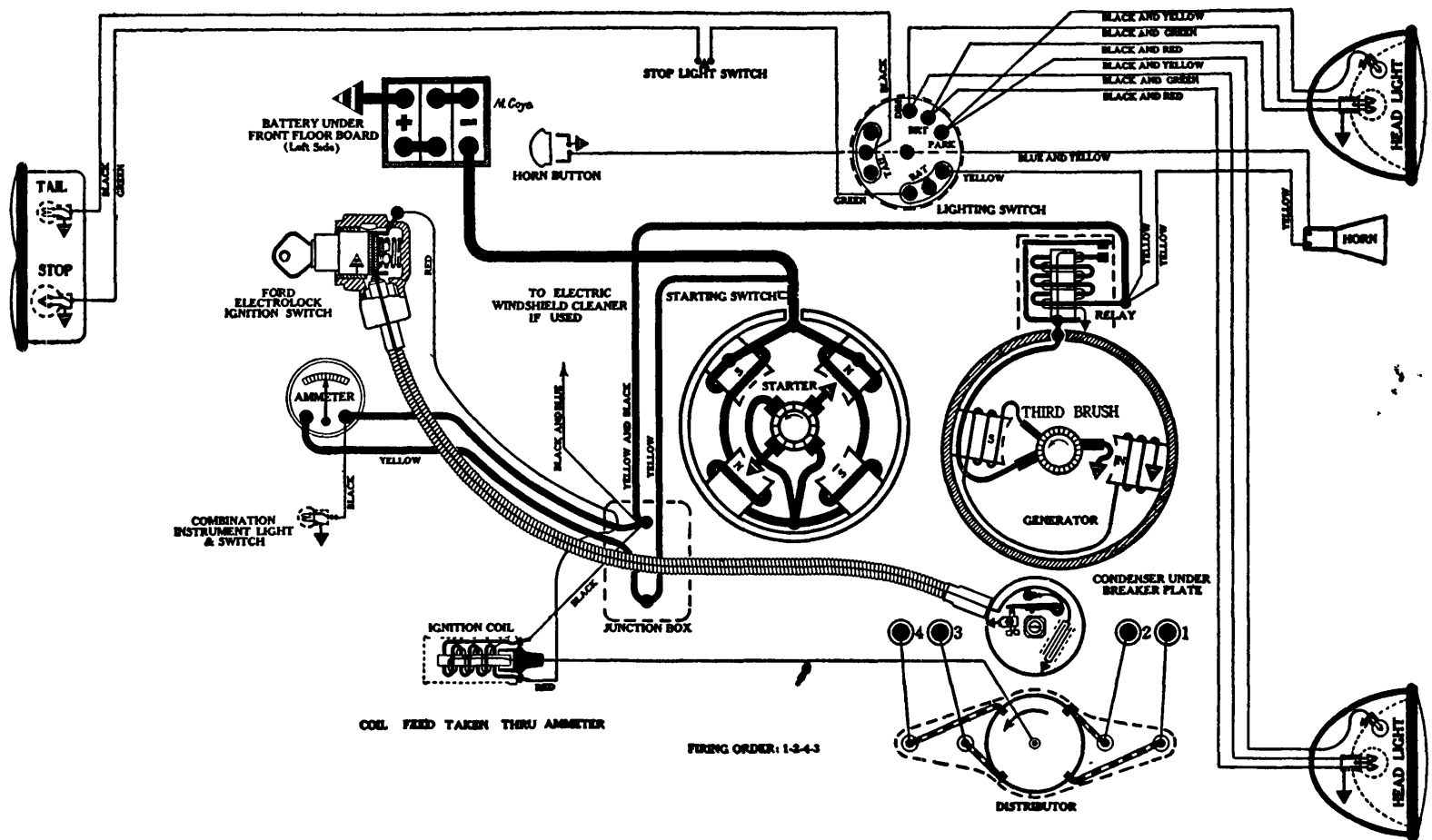
Location—On frame under engine hood (left side). Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse on switch.

Lamps—See P. 3, Sec. AA. **HEAD**—11-10 (Bifocal); **SIDE**—63; **TAIL**—63; **INSTRUMENT**—63; **STOP**—87; **DOVE**—63.

FORD

Model A, (1930).

**BATTERY**

Ford, A-10655, 6 volts. Positive Terminal Grounded
 Starting Capacity—98 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 17 hours.
 Box—Length, 9 $\frac{3}{8}$; width, 7 $\frac{1}{2}$; height, 9 $\frac{1}{2}$ inches.

STARTER

Rotation, L. H., Com. End
 Ford

Connection to Engine—Bendix Drive.
 Running Free—60 amps. at 6 volts, 3400 R.P.M.
 Cranking Engine—145-165 amps. at 5.1 volts.
 Lock Torque—13.5 pound-feet, 675 amps., 3.2 volts.
 Brush Spring Tension—24-28 oz. on each.
 Starting Switch—On Starter, operated by foot plunger.

IGNITION

Rotation, L. H., Top View
 Ford

Breaker—Contact separation .018 to .020 inch.
IMPORTANT: (Check contact separation with care. Do not exceed these limits.)
 Contact Spring Tension—16 to 18 oz.
 Timing—1—Check contact separation. 2—Retard spark lever. 3—Screw out TIMING PIN found in timing case cover, and insert rounded end in same hole. 4—Hand crank engine until pin is felt to drop in recess in cam shaft gear. 5—Remove Distributor cap and rotor button. 6—Loosen cam locking screw. 7—Replace rotor button and turn until metal strip is opposite No. 1 contact. 8—Remove rotor button and turn cam slightly L. H. (top view) until contacts just open. 9—Lock cam; assemble head; replace timing pin.
 Spark Plugs— $\frac{7}{8}$ " special (AC type Z); Gap .025 inch.
 Firing Order—1-2-4-3.
 Manual Advance—38 degrees (on Flywheel).

Automatic Advance—None.

Coil—Auto-Lite-Ford.

Ignition Switch—Special "Electrolock." For details of operation and tests see P. 17, Sec. "AA".

GENERATOR

Rotation, L. H., Com. End
 Ford, Two Pole (Belt Drive)

Performance Data—Gen. cold.

Amps	RPM	Volts
0	725	6.5
2	750	6.6
5	825	7.1
10	1050	7.8
14	1450 (Max)	7.9

Motoring Freely—5 $\frac{1}{2}$ amps. at 6 volts.

Max. Stall Current—22 to 25 amps. at 6 volts.

Field Test—4 $\frac{1}{2}$ amps. at 6 volts.

Brush Spring Tension—22 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Ford

Closes—7-7 $\frac{1}{2}$ volts.

Opens—0-2.5 amps. discharge.

Contact Gap—.015-.020 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Ford No. A-11653-B.

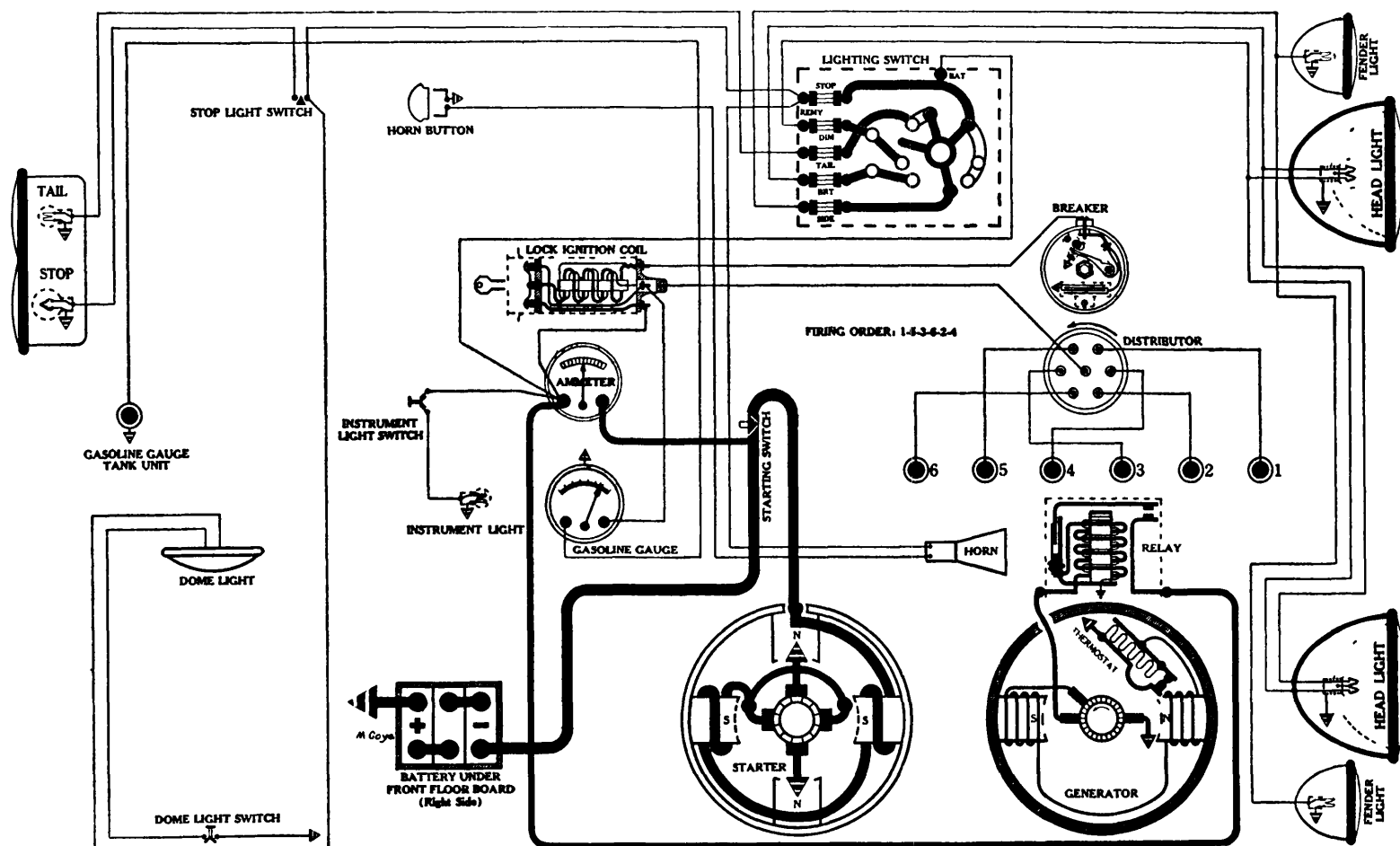
Location—Foot of steering column. Lights controlled by lever on steering wheel. Wires soldered to terminals.

Fuses—Non.

Lamps—HEAD—1110 (Bifocal); AUX.—63; STOP—1129; TAIL—63.

GARDNER

Model 136, 6 cyl. (1930-31)



BATTERY

Prest-O-Lite, 6-15-J, 6 volts. Positive Terminal Grounded
Starting Capacity—119 amps. for 20 minutes.
Lighting Capacity—5 amps for 20 hours
Box—Length, 10 5/16; width, 7; height, 9 1/8 inches

STARTER

Rotation, R. H., Com. End
Delco-Remy, 716-A

Connection to Engine—Bendix drive.

NOTE Gear reduction job A 14 T pinion cut on armature shaft drives 22 T pinion on Bendix shaft.

Running Free—50 amps. at 5 volts, 4000 R.P.M.

Cranking Engine—175-180 amps. at 4.5 volts.

Lock Torque—14 pound-feet, 350 amps, 32 volts.

Brush Spring Tension—24-26 oz. on each.

Starting Switch—Delco-Remy, 406-D.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 640-L

Breaker—Contact separation .022 inch.

Contact Spring Tension—18 to 20 oz.

Timing—With No. 1 Piston on T.D.C., power stroke, fly-wheel mark "No 1 T D C" opposite pointer, spark fully advanced, rotor opposite No 1 Dist Cap Terminal; breaker points should just open

Spark Plugs—7/8 inch. (Champion No. 4); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	0	200	0
800	4	400	2
1200	8	600	4
1600	12	800	6
2000	16	1000	8
2400	20	1200	10
2600	22	1300	11

Lock Ignition Coil—Delco-Remy, 526-W.

NOTE This unit is a combined ignition switch and coil. Impossible to 'jump out' ignition switch with wire to run engine. Coil has three primary terminals marked "Bat", "Gauge", and "Timer". Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-H

Performance Data—Gen. cold. Thermostat closed.

Amps	RPM	Volts	Amps	RPM	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE Thermostat opens about 165° F, reducing charging rate approx 30-40%

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—0.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 420-Q.

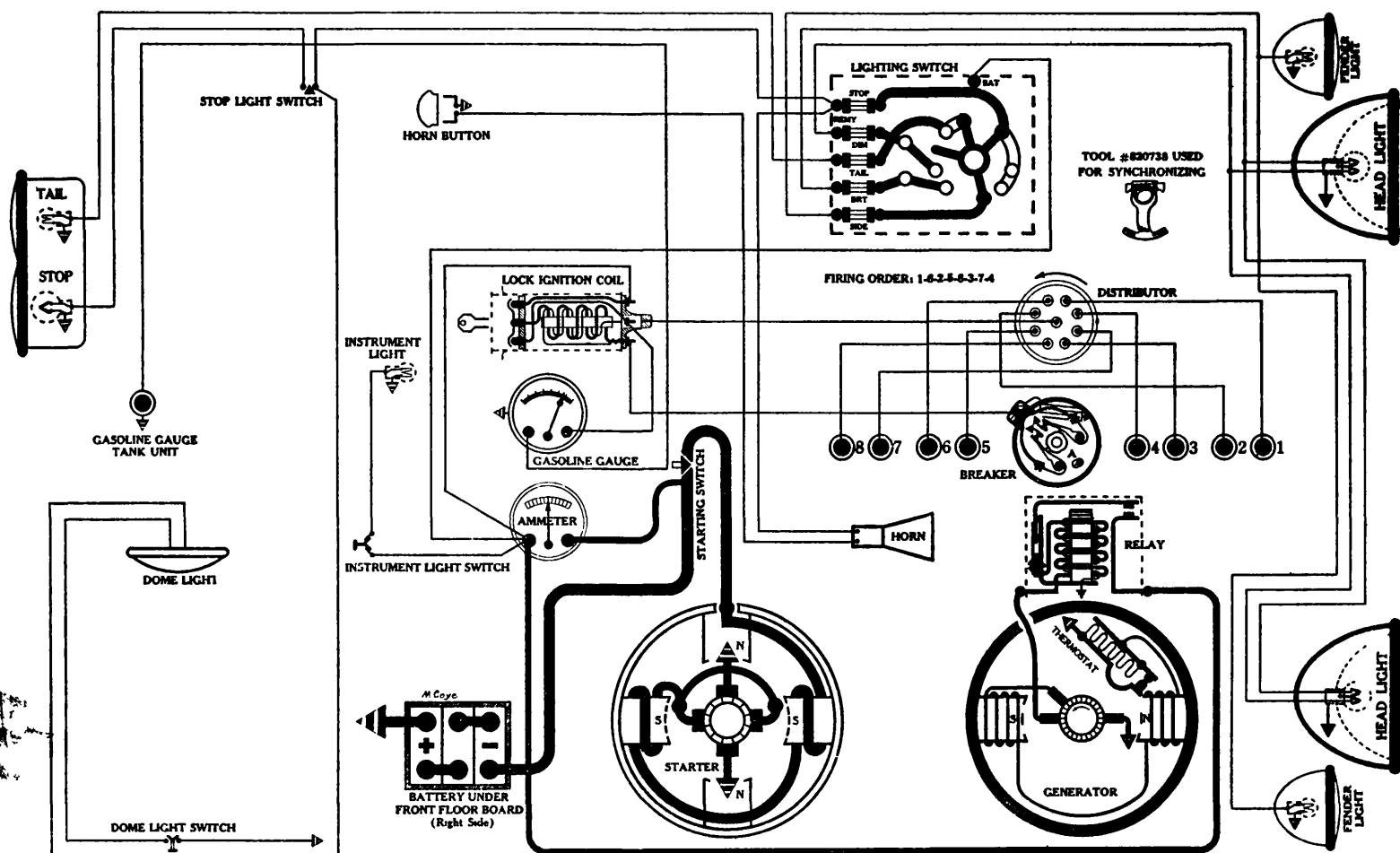
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Five, 10 amp. fuses under lighting switch cover.

Lamps—See P. 3, Sec. AA. HEAD—1110, (Bifocal); FENDER—63; STOP—87; TAIL—63; INSTRUMENT—63; DOME—63.

GARDNER

Model 140, Straight Eight, (1930-31)



BATTERY

Model-O-Lit, 6-15-J, 6 volts. Positive Terminal Grounded
Starting Capacity—119 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7; height, 9 1/8 inches.

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 716-A

Connection to Engine—Bendix drive.

NOTE Gear reduction job A 14 T pinion cut on armature shaft drives 22 T pinion on Bendix shaft.

Running Free—50 amps. at 5 volts, 4000 R.P.M

Cranking Engine—175 to 180 amps at 4.5 volts.

Lock Torque—14 pound-feet, 350 amps., 3.2 volts.

Brush Spring Tension—24 to 26 oz. on each.

Starting Switch—Delco-Remy, 406-D.

IGNITION

Rotation, L. H., Top View
 Delco-Remy, 658-B

Break r—Contact separation .022 inch.

Contact Spring Tension—18 to 20 oz. on each

Timing—With No. 1 Piston on T.D.C., power stroke, fly-wheel mark "No. 1 T.D.C." opposite pointer, spark fully advanced, rotor opposite No. 1 Dist Cap Terminal, breaker points just open

Spark Plugs—7/8 inch (Champion No. 4); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—15 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
300	0-0	150	0 0
1000	2 5-6 5	500	1 3
1800	13-17	900	6 5 8 5

Lock Ignition Coil—Delco-Remy, 526-W.

NOTE This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat", "Gauge", and "Timer". Coil must be connected as marked

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 955-H

Performance Data—Gen. cold. Thermostat closed.

Amps	RPM	Volts	Amps	RPM	Volts
0	575	6 5	15	1200	8 1
3	700	7	20	1450 (Max)	8 3
6	800	7 1	19	1700	8 3
11	1000	7 9			

NOTE Thermostat opens about 165° F., reducing charging rate approx 30-40%

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts

Field Test—4 3/4 to 5 1/2 amps. at 6 volts, across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 420-Q.

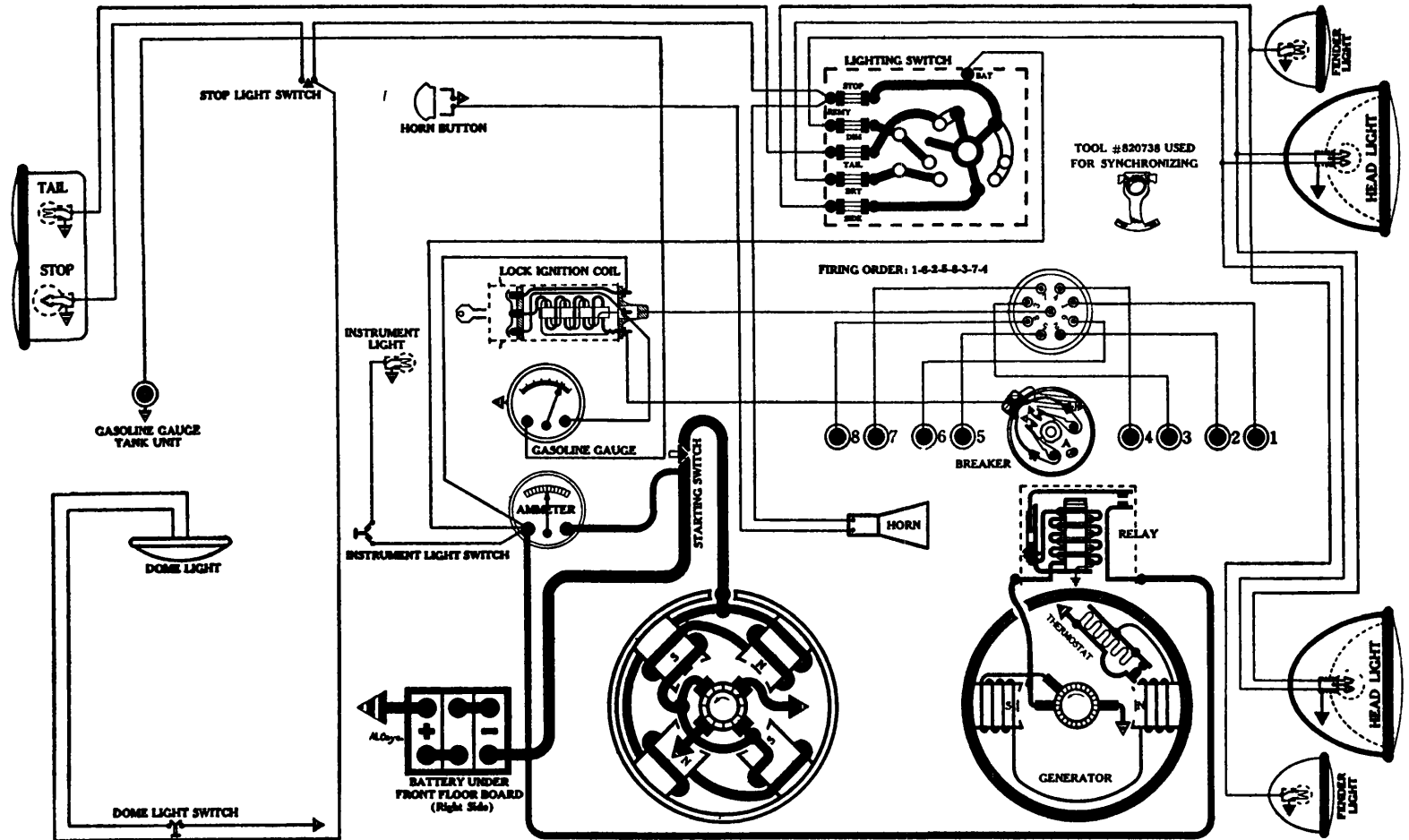
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Five, 10 amp. fuses under lighting switch cover.

Lamps—See P. 3, Sec. AA. HEAD—1110, (Bifocal); FENDER—63; STOP—87; TAIL—63; INSTRUMENT—63; DOME—63.

GARDNER

Mod 1 150, Straight Eight, (1930-31)



BATTERY

Prest-O-Lite, 6-17-RF, 6 volts. Positive Terminal Grounded
Starting Capacity—150 amps. for 20 minutes.
Lighting Capacity—5 amps. for 25 hours.
Box—Length, 13; width, 7; height, 9 1/8 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 720-V

Connection to Engine—Bendix drive.
Running Free—65 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—185-190 amps. at 4.1 volts.
Lock Torque—15 pound-feet, 570 amps., 3.1 volts.
Brush Spring Tension—24-28 oz. on each.
Starting Switch—Delco-Remy, 406-D.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 658-R

Breakers—Contact separation .022 inch.
Contact Spring Tension—18 to 20 oz. on each.
Timing—With No. 1 Piston on T.D.C., power stroke, fly-wheel mark "No. 1 T.D.C." opposite pointer, spark fully advanced, rotor opposite No. 1 Dist Cap Terminal; breaker points should just open.
Spark Plugs—7/8 inch. (Champion No. 4); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—15 degrees (on Flywheel).
Automatic Advance—15 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist. RPM.	Degrees Advance (on cam)
300	0 1	150	0 5
1000	2 5-6 5	500	1 25 3 75
1800	13-16	900	6.5-8

Lock Ignition Coil—Delco-Remy, 526-W.

NOTE—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.", "Gauge", and "Timer". Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-K

Performance Data—Gen. cold.			Thermostat closed.		
Amps.	RPM	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE—Thermostat opens about 165° F, reducing charging rate approx 30-40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 420-Q.

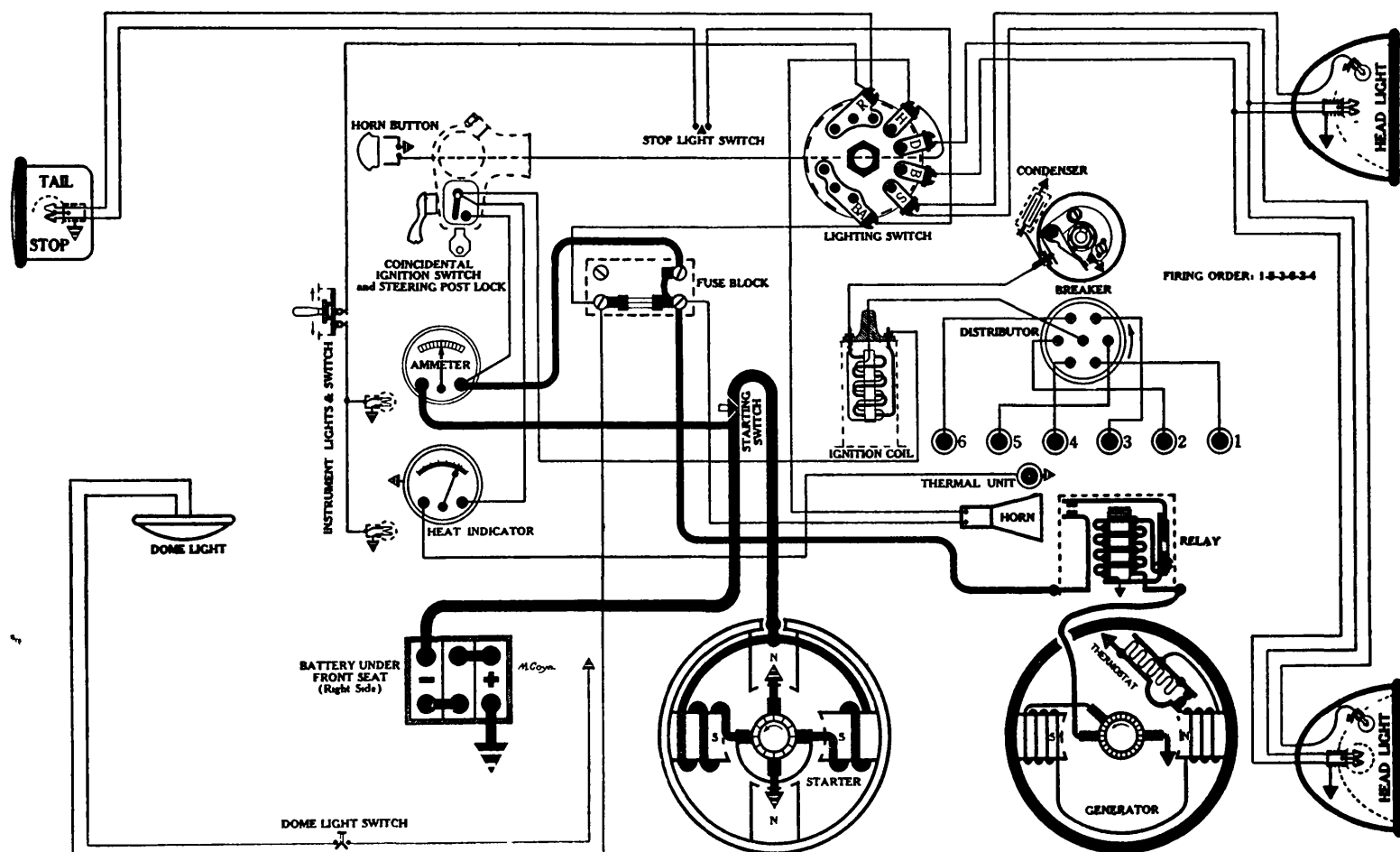
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Five, 10 amp. fuses under lighting switch cover.

Lamps—See P. 3, Sec. AA. **HEAD**—1110, (Bifocal); **FENDER**—63; **STOP**—87; **TAIL**—63; **INSTRUMENT**—63; **DOME**—63.

GRAHAM

Model, Standard Six, (1930)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded
 Starting Capacity—98 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 17 hours.
 Box—Length, 9 1/16; width, 7 1/16; height, 8 7/8 inches

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 713-K

Connection to Engine—Bendix drive.
 Running Free—65 amps. at 5 volts, 5000 R.P.M.
 Cranking Engine—175-180 amps. at 4.5 volts
 Lock Torque—12 pound-feet, 475 amps, 3.6 volts
 Brush Spring Tension—24-28 oz. on each.
 Starting Switch—Delco-Remy, 406-A.

IGNITION

Rotation, L. H., Top View
 Delco-Remy, 639-K

Breaker—Contact separation .020 inch.
 Contact Spring Tension—18 to 20 oz
 Timing—With No. 1 Piston on compression stroke, bring flywheel mark "IGN 1" opposite pointer, spark fully advanced, rotor opposite No. 1 Dist Cap Terminal, breaker points should just open
 Spark Plugs—7/8 inch Long Regular (Champion No. 3), Gap .025 inch
 Firing Order—1-5-3-6-2-4.
 Manual Advance—20 degrees (on Flywheel).
 Automatic Advance—22 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	0 1	200	0 5
600	4 6	300	2 3
800	10 12	400	5 6
1200	14 16	600	7 8
1800	20 22	900	10 11

Coil—Delco-Remy, 528-C.

Ignition Switch—Hershey-Oakes Steering Ignition Lock — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 959-C

Performance Data—Gen. cold. Thermostat closed.

Amps	RPM	Volts	Amps	RPM	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE Thermostat opens about 165° F, reducing charging rate approx 30-40%

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton No. 50239.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

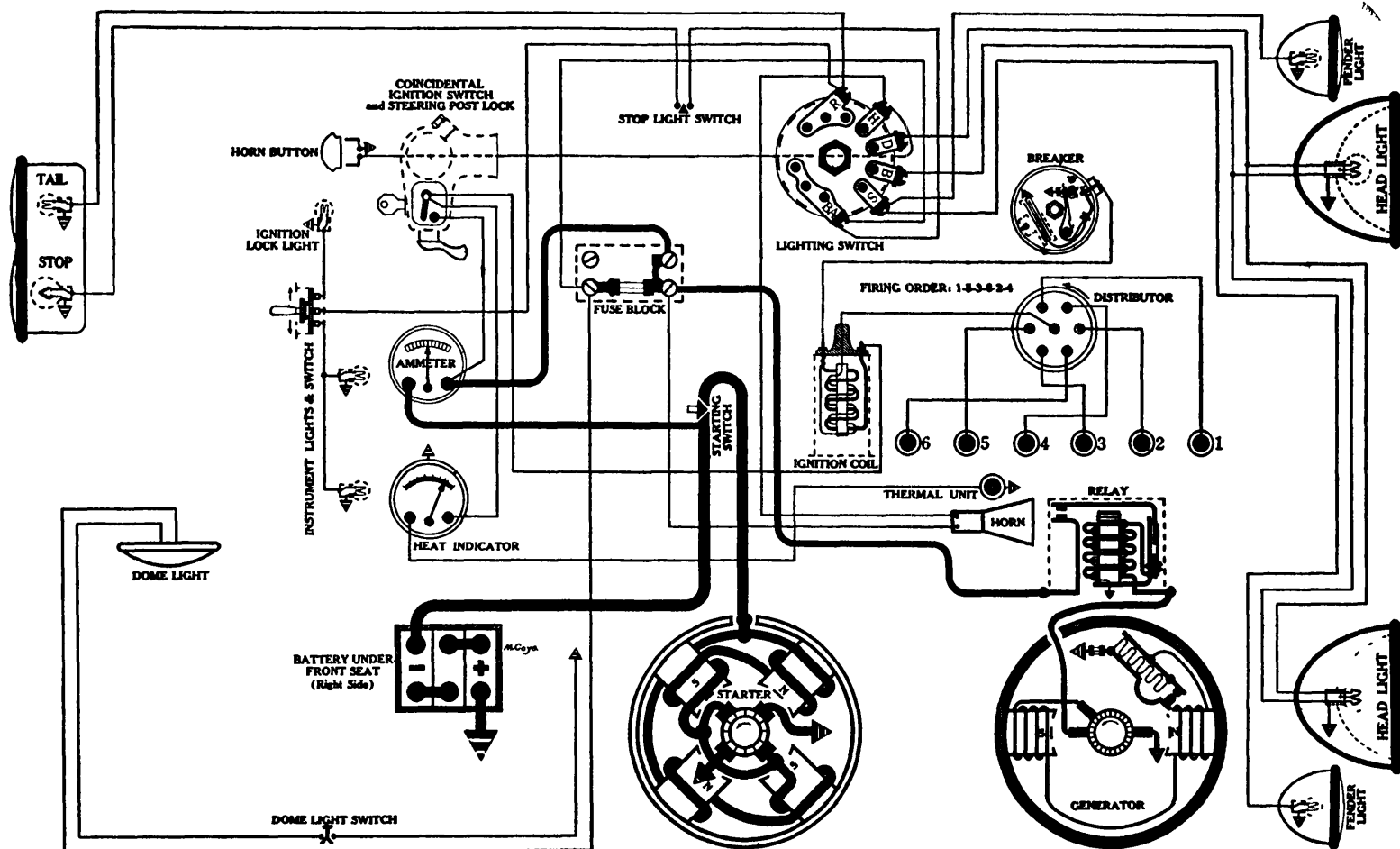
Fuse—Single 20 amp. fuse mounted on dash (driver's side).

Lamps—See P. 3, Sec. AA. HEAD—1110, (Bifocal), AUX—63; INSTRUMENT—63; DOME—63; STOP and TAIL—1158.

NOTE This is the old style Ford headlight bulb with two filaments. Make sure the 3 CP filament burns for tail light.

GRAHAM

Model, Special Six, (1930)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7 1/16; height, 8 3/4 inches.

STARTER

**Rotation, L. H., Com. End
Delco-Remy, 718-E**

Connection to Engine—Bendix drive.
Running Free—65 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—160-175 amps. at 4.3 volts.
Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
Brush Spring Tension—24-28 oz. on each.
Starting Switch—Delco-Remy, 406-A.

IGNITION

**Rotation, L. H., Top View
Delco-Remy, 640-W**

Breaker—Delco-Remy, 310-W.
Contact separation—.020 inch.
Contact Spring Tension—18 to 20 oz.
Timing—With No. 1 Piston on compression stroke, bring flywheel mark "IGN-1" opposite pointer, spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs— $\frac{7}{8}$ inch Long Regular (Champion No. 3); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Manual Advance—30 degrees (on Flywheel).
Automatic Advance—22 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	- - 0-1	200	0-5
600	----- - 4-6	300	- - 2-3
800	-- -- 10-12	400	- - 5-6
1200	- - 14-16	600	- - 7-8
1800	- 20-22	900	- 10-11

Coil—Delco-Remy, 528-C.
Ignition Switch—Hersh y-Oakes Steering Ignition Lock — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 957-B

Performance Data—Gen. cold. Thermostat clos d.

Amps	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE Thermostat opens about 165° F, reducing charging rate approx 30-40%

Motoring Freely—5-5½ amps. at 6 volts.
Max. Stall Current—18-20 amps. at 6 volts.
Field Test—4¾ to 5½ amps. at 6 volts across field coils in series.
Field Fuse—6 amps.
Brush Spring Tension—16-18 oz. on each.
Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

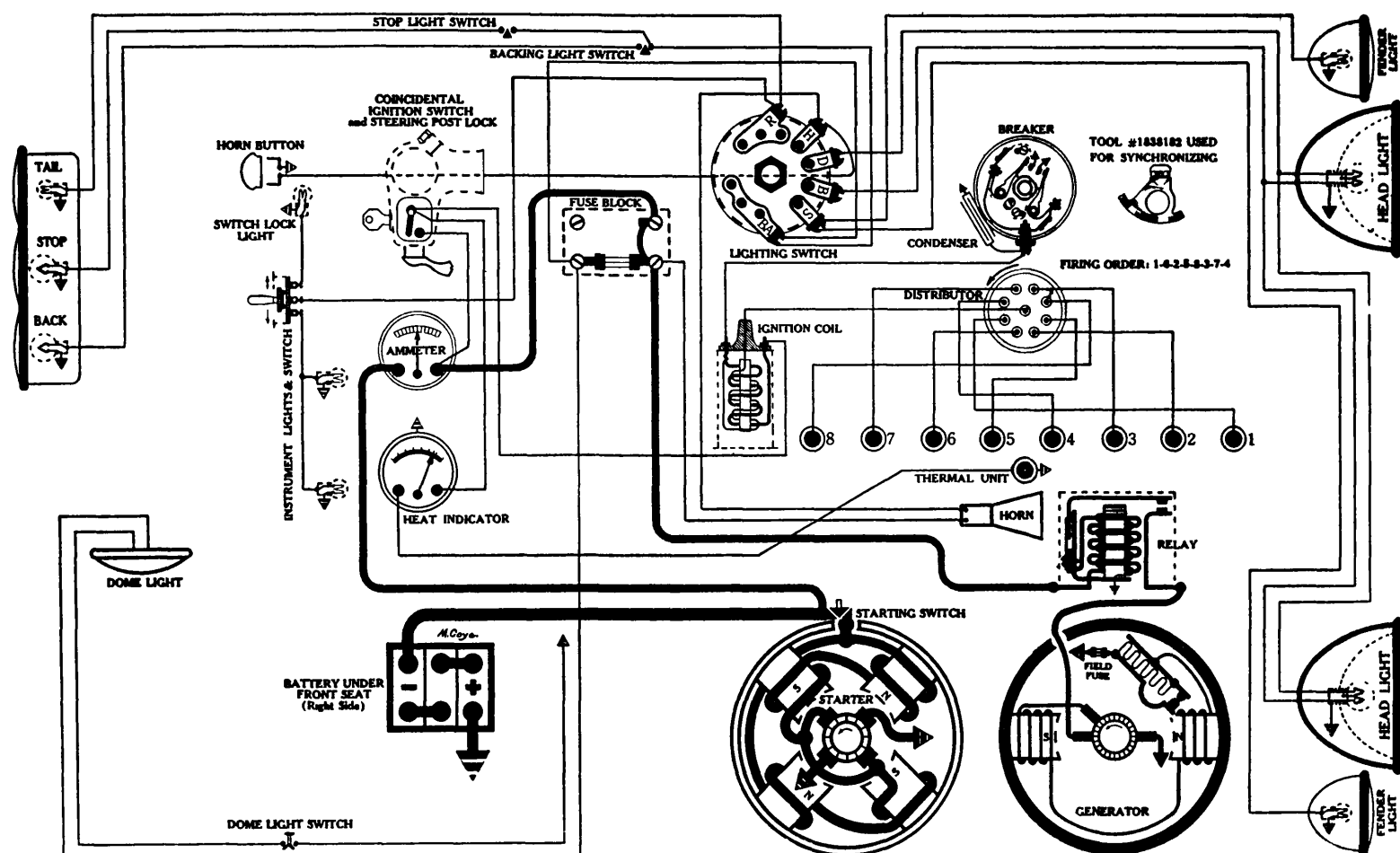
Closes—7 to 7½ volts.
Opens—0 to 2½ amps. discharge.
Contact Gap—.015 to .025 inch.
Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton No. 50239.
Location—Foot of steering column. Lights controlled by lever on steering wheel.
Fuse—Single 20 amp. fuse mounted on dash (driver's side).
Lamps—See P. 3, Sec. AA. **HEAD**—1110 (Bifocal);
FENDER—63; **INSTRUMENT**—63; **DOM**E—63;
STOP—87; **TAIL**—63.

GRAHAM

Mod Is, Standard and Special Straight Eights, (1930)



BATTERY

Willard, WS-2-15, 6 Volts. Positive Terminal Grounded
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7 1/16; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 725-K

Conn ction to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Fr e—60 amps. at 5 volts, 6000 R.P.M.

Cranking Engin —165-185 amps. at 4.2 volts.

Lock Torque—16 pound-feet, 600 amps. at 3 volts.

Brush Spring T nsion—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 660-C

IMPORTANT NOTE—The 660 series of D R Distributors is new in 1930. A special new synchronizing tool has been developed for making adjustments. For detailed instructions in synchronizing see P. 32, Sec. AA.

Breakers—Contact separation .020 inch.

Contact Spring T nsion—18 to 20 oz. on each.

Timing—With No. 1 Piston on compression stroke, bring flywheel mark "S.F. ADV-No. 1" opposite pointer. Spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—7/8 inch Long Regular (Champion No. 3); Gap .025 inch.

Firing Ord r—1-6-2-5-8-3-7-4.

Manual Advance—30 degrees (on Flywheel).

Automatic Advance—18 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist R.P.M.	Degrees Advance (n cam)
600	0	300	0
1000	3	500	1 1/2
1400	7	700	3 1/2
1800	11	900	5 1/2
2200	14	1100	7
2600 (Max)	18	1300	9

Coil—Delco-Remy, 528-C.

Ignition Switch—Hershey-Oakes Steering Ignition Lock —
 Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 957-B

Performance Data—Gen. cold. Thermostat closed.

Amps	R P M	Volts	Amps	R P M	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE—Thermostat opens about 165° F, reducing charging rate approx 30-40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Field Fuse—6 amps.

Brush Spring Tension—16 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton No. 50239.

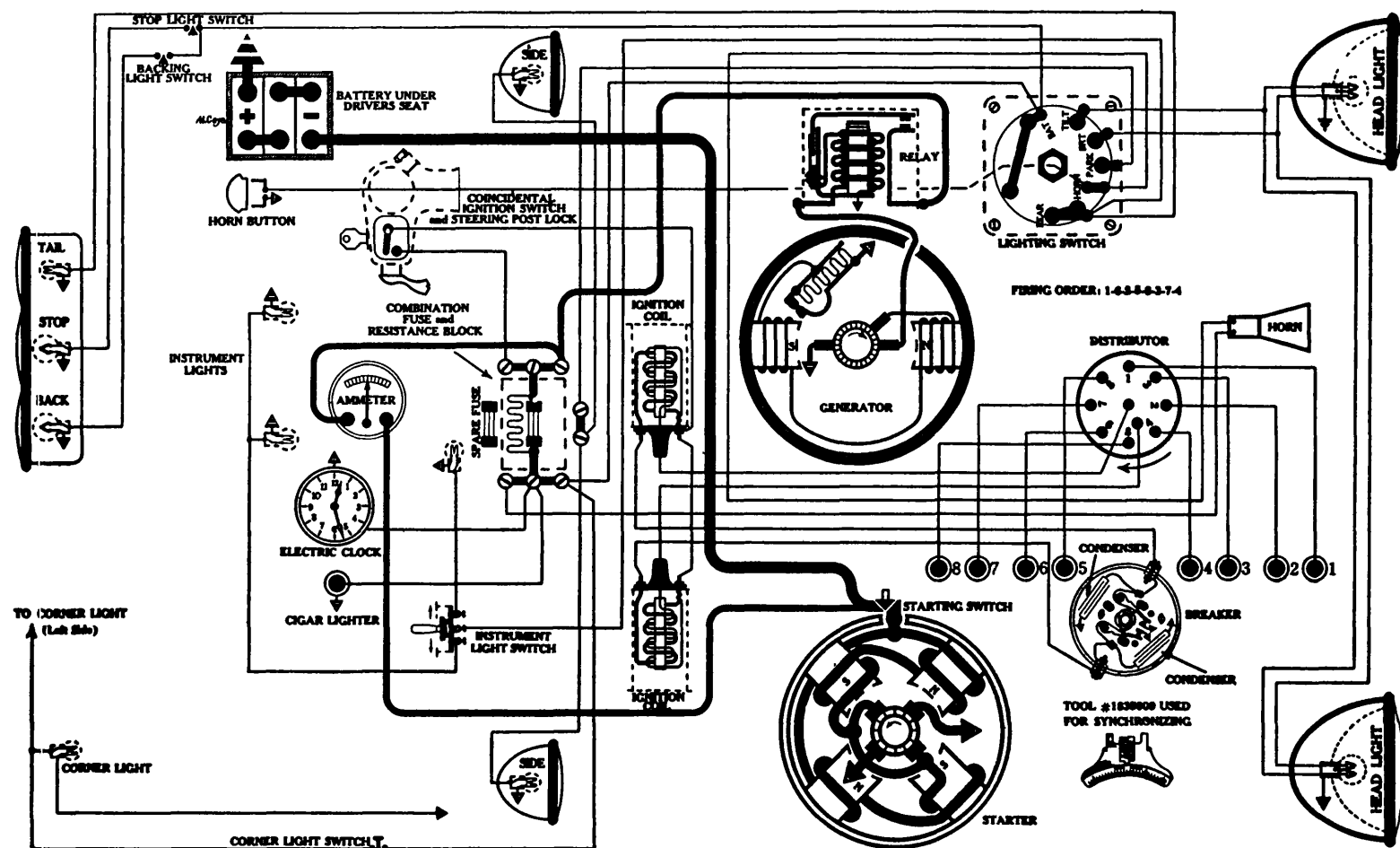
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuse—Single 20 amp. fuse mounted on dash (driver's side).

Lamps—See P. 3, Sec. AA. **HEAD**—1110 (Bifocal); **FENDER**—63; **INSTRUMENT**—63; **DOME**—63; **STOP**—87; **TAIL**—63; **BACK**—1129.

GRAHAM

Model, Custom Straight Eight, (1930)



BATTERY

Willard, WS-4-17, 6 volts. Positive Terminal Grounded
 Starting Capacity—130 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 23 hours.
 Box.—Length, 11 11/16; width, 7 1/16; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 725-G

Connection to Engine—Mechanical gear shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R.P.M.
 Cranking Engine—165-185 amps. at 4.2 volts.
 Lock Torque—16 pound-feet, 600 amps. at 3 volts.
 Brush Spring Tension—24 to 28 oz. on each.
 Starting Switch—Delco-Remy, 16210.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 668-J

Breakers—Contact separation .020 inch.
 Contact Spring Tension—18 to 20 oz. on each.
 Timing—With No. 1 Piston on compression stroke, bring flywheel mark "IGN-1" opposite pointer, spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (Champion No. 8); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—15 degrees (on Flywh 1).

Automatic Advanc —22 degrees (on Flywh el).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	0	200	0
800	4	400	2
1200	7	600	3.5
1600	11	800	5.5
2400	18	1200	9
2600	22	1300	11

Coil—Delco-Remy, 528-C.

Ignition Switch—Hershey-Oakes Steering Ignition Lock — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, R. H., Com. End
 Delco-Remy, 957-C

Performance Data—Gen. cold. Thermostat clos d.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE Thermostat opens about 165° F, reducing charging rate approx 30-40%

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Field Fuse—6 amps.

Brush Spring Tension—16-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton No. 40585.

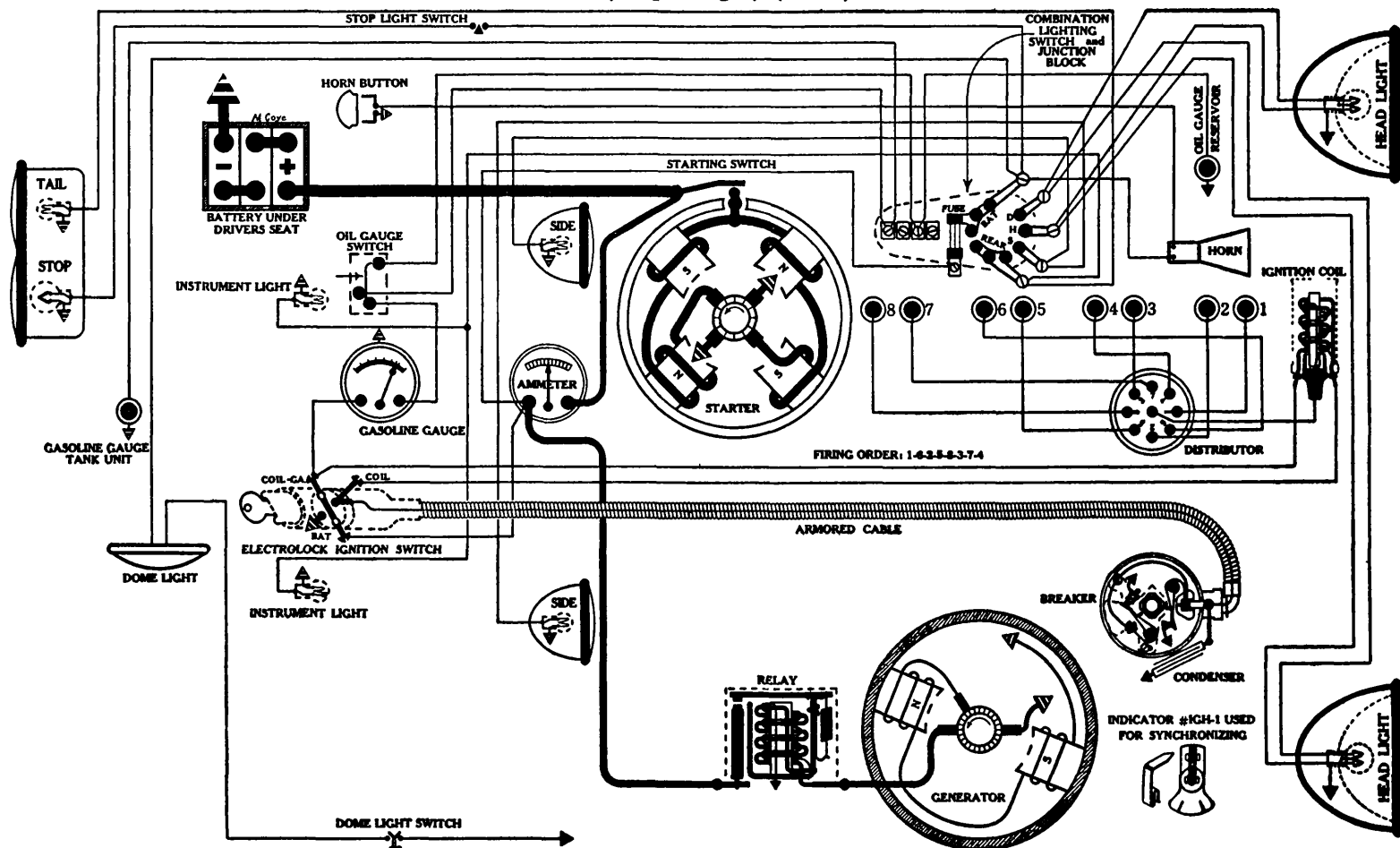
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuse—20 amp. fus and spar fuse mounted on North East fuse block and resistance assembly No. 22045.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal), SIDE—63; DOME—63; GEAR SHIFT LIGHT—63; STOP—1129; TAIL—63; BACK—1129.

HUDSON

Model, Super-Eight, (1930)



BATTERY

Exide, 3-X1-13-1-G, 6 Volts. Negative Terminal Grounded
 Starting Capacity—98 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 16½ hours.
 Box—Length, 9; width, 7⅛; height, 9 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAD-4108

Conn ction to Engine—Bendix drive.
 Running Free—50 amps. at 5½ volts.
 Cranking Engine—155 to 170 amps. at 4½ volts
 Lock Torque—16 pound-feet, 610 amps at 3 volts.
 Brush Spring Tension—20 to 28 oz. on each.
 Starting Switch—Mounted on starter. Operated by pull cable from instrument board.

IGNITION

Rotation, R. H., Top View
 Auto-Lite, IGH-4009
 (Full Automatic Spark Advance)

Breakers—Contact separation .020 inch
 Contact Spring Tension—17 to 19 oz. on each
 Timing—With No. 1 Piston on T.D.C., power stroke, fly-wheel mark "UDC 1 8" opposite pointer, rotor button opposite No. 1 Dist Cap Terminal, stationary set of breaker points should just open
 Spark Plugs—Metric (AC Type G-10); Gap .022 inch.
 Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—20 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist R.P.M.	Degrees Advance (on cam)
800	0	400	0
1400	4	700	2
2400	10	1200	5
3000	14	1500	7
4000 (Max)	20	2000	10

Coil—Auto-Lite, CE-4012.

Ignition Switch—"Electrolock", type 9-B. For details of operation and instructions on servicing, see P. 22, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAM-4102

Performance Data—Gen. cold.

Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	550	6.5	14	950	7.9
2	600	6.9	16	1100	8
5	650	7.1	17	1350 (Max)	8
10	800	7.8			

Motoring Freely—4½ to 5½ amps. at 6 volts.

Max. Stall Current—18-19 amps. at 6 volts.

Field Test—4½ amps at 6 volts across field coils in series.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4016

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold No. 8000-A. (Combination lighting switch and junction block.)

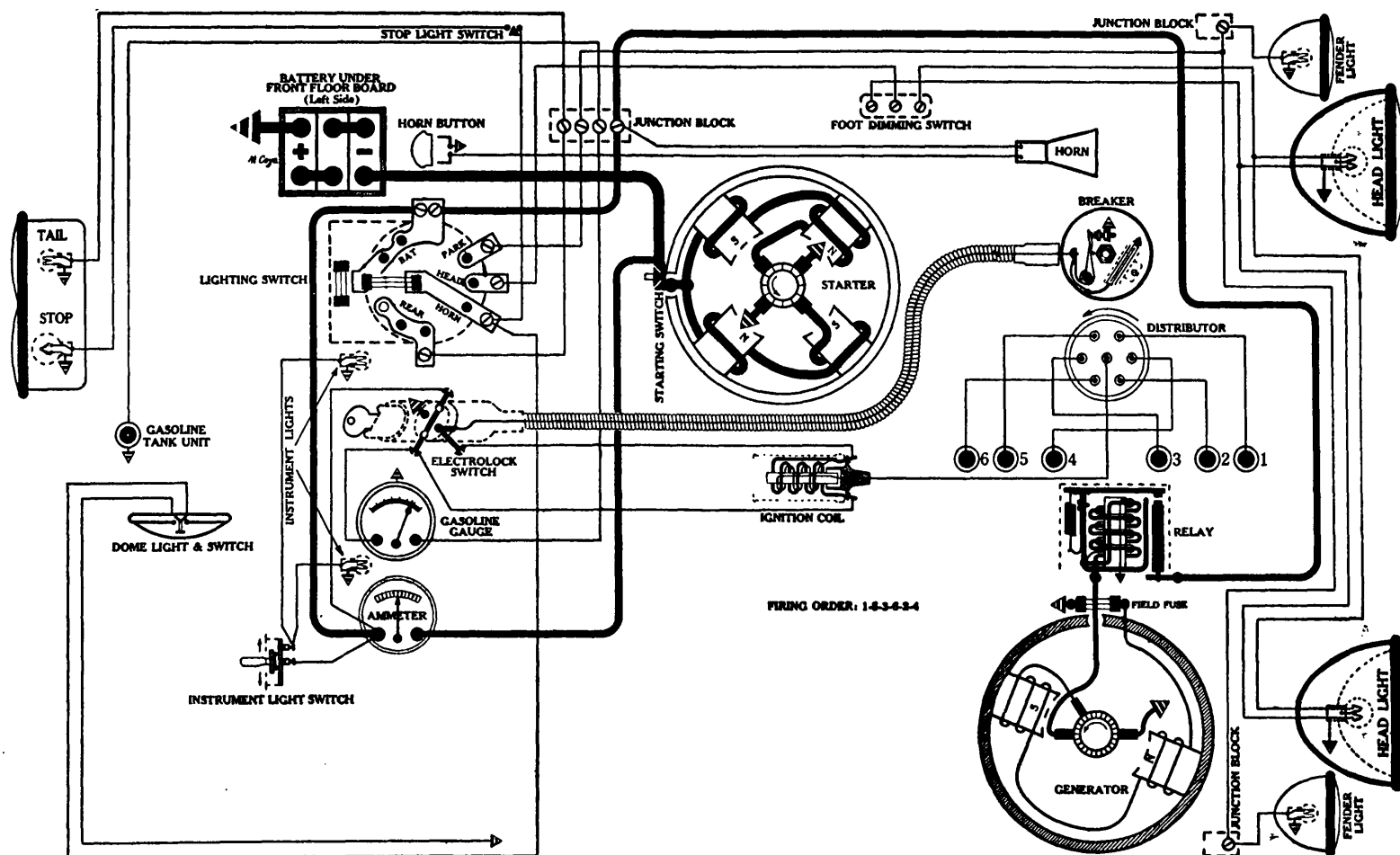
Location—On frame under engine hood (left side). Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse on switch.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; TAIL—63; INSTRUMENT—63; STOP—87; DOME—63.

HUPMOBILE

Model, S, 6 cyl., (1930)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded
 Starting Capacity—114 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 20 hours.
 Box—Length, 10 5/16; width, 7 1/16; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAC-4221

Connection to Engine—Bendix drive.
 Running Free—50 amps. at 5.5 volts.
 Cranking Engine—160 amps. at 4.7 volts, 184 R.P.M.
 Lock Torque—11.5 pound-feet, 540 amps., 3 volts.
 Brush Spring Tension—20 to 24 oz. on each.
 Starting Switch—Mounted on starter. Operated by pull cable from instrument board.

IGNITION

Rotation, L. H., Top View
 Auto-Lite, IGC-4028

Breaker—Contact separation .020 inch.
 Contact Spring Tension—17 to 19 oz.
 Timing—With No. 1 Piston on T.D.C., power stroke flywheel mark "DC-1-6" opposite indicator, spark fully retarded, rotor opposite No. 1 Dist. Cap Terminal; breaker points should just open.
 Spark Plugs—Metric (Champion No. 10); Gap .025 inch.
 Firing Order—1-5-3-6-2-4.

Manual Advance—30 degrees (on Flywheel).

Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
1000.....	0.....	500.....	0.....
1600.....	4.....	800.....	2.....
2600.....	8.....	1300.....	4.....
3600.....	16.....	1800.....	8.....

Coil—Auto-Lit, IG-4080.

Ignition Switch—"Electrolock", type 9-B. For details of operation and instructions on servicing, see P. 22, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAL-4124

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0.....	650.....	6.5	10.....	1075.....	7.3
2.....	720.....	6.6	14.....	1340.....	7.7
5.....	850.....	7.	16.....	1800.....	8.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—16-19 amps. at 6 volts.

Field Test—4 1/2 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts close d.

LIGHTING

Switch—Briggs & Stratton No. 40956.

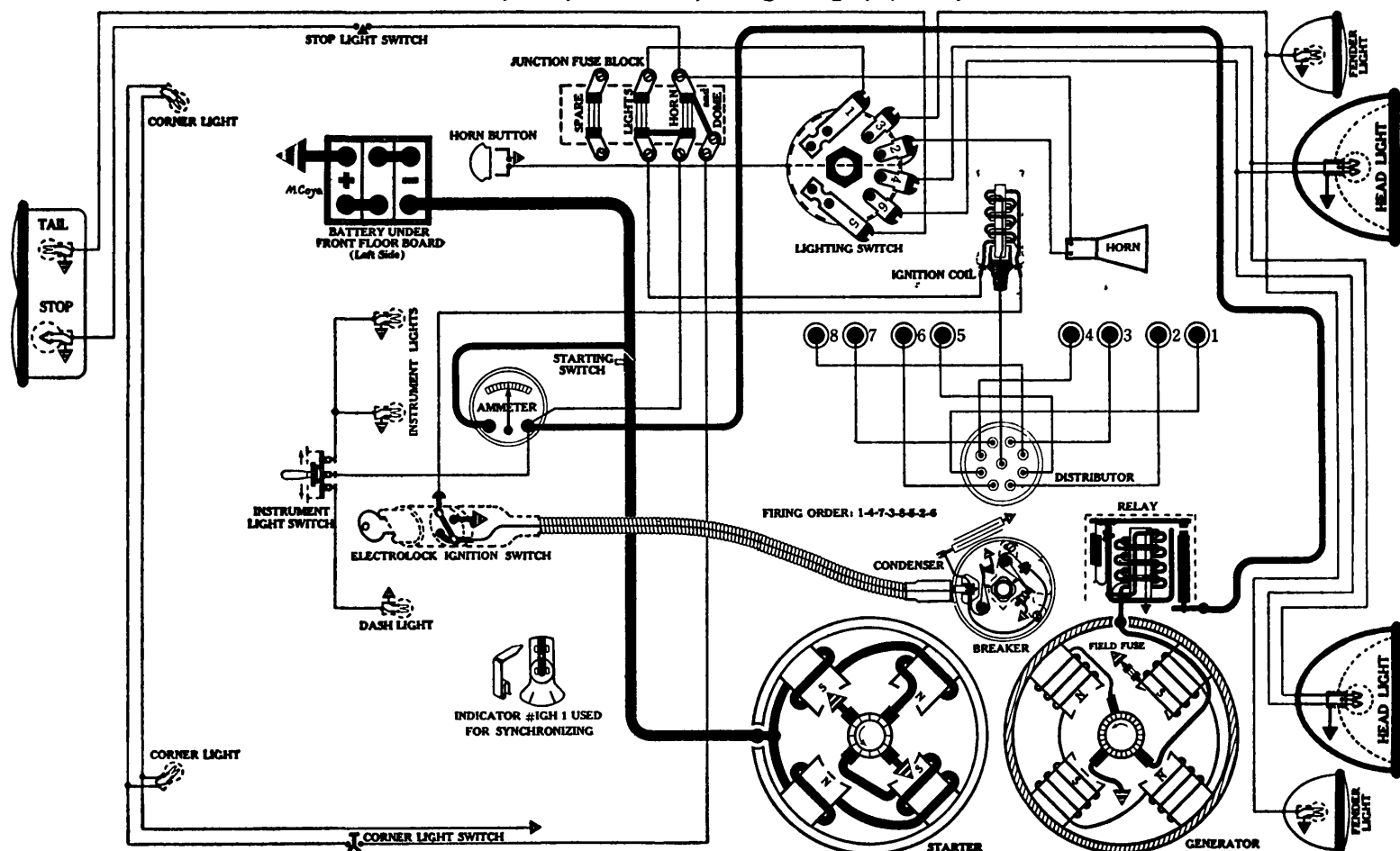
Location—Behind instrument board. Operated by pull knob.

Fuses—Single 20 amp. fuse with spare mounted on switch back.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

HUPMOBILE

Model, "C", 100 H. P., Straight Eight, (1930)



BATTERY

Willard, WJ-2-13, 6 Volts. Positive Terminal Grounded
Starting Capacity—125 amps. for 20 minutes.
Lighting Capacity—5 amps. for 22 hours.
Box—Length, 10 5/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4021

Connection to Engine—Bendix drive.
Running Free—60 amps. at 6 volts.
Cranking Engine—160-170 amps. at 5 volts
Lock Torque—17 pound-feet, 520 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Auto-Lite, SW-4002.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGH-4008

Breaks—Contact separation .020 inch.
Contact Spring Tension—17 to 19 oz. on each
Timing—With No. 1 Piston on compression stroke, spark fully advanced, bring flywheel mark found 1 inch ahead of "1-8 DC" opp site pointer, rotor opposite No 1 Dist Cap Terminal, stationary set of breaker points should just open
Spark Plugs—Metric (Champion No. 8); Gap .025 inch.
Firing Order—1-4-7-3-8-5-2-6.

Manual Advance—18 degrees (on Flywheel).

Automatic Advance—16 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
800	0	400	0
1000	5	500	2 1/2
2400	9	1200	4 1/2
3200	14	1600	7
3600	16	1800	8

Coil—Auto-Lite, CE-4001.

Ignition Switch—"Electrolock", Type 9-A. For theory of operation and instructions on servicing see P. 21, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAG-4118

Performance Data—Gen. cold.

Amps	RPM	Volts	Amps	RPM	Volts
0	525	6.5	10	780	7.3
2	550	6.6	14	1200	7.7
5	650	7	17	1250 (Max)	8

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—17 to 19 amps. at 6 volts.

Field Test—4 amps at 6 volts across field coils in series

Field Fuse—7 1/2 amps

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4012

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—0.025 to 0.035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 6050-A.

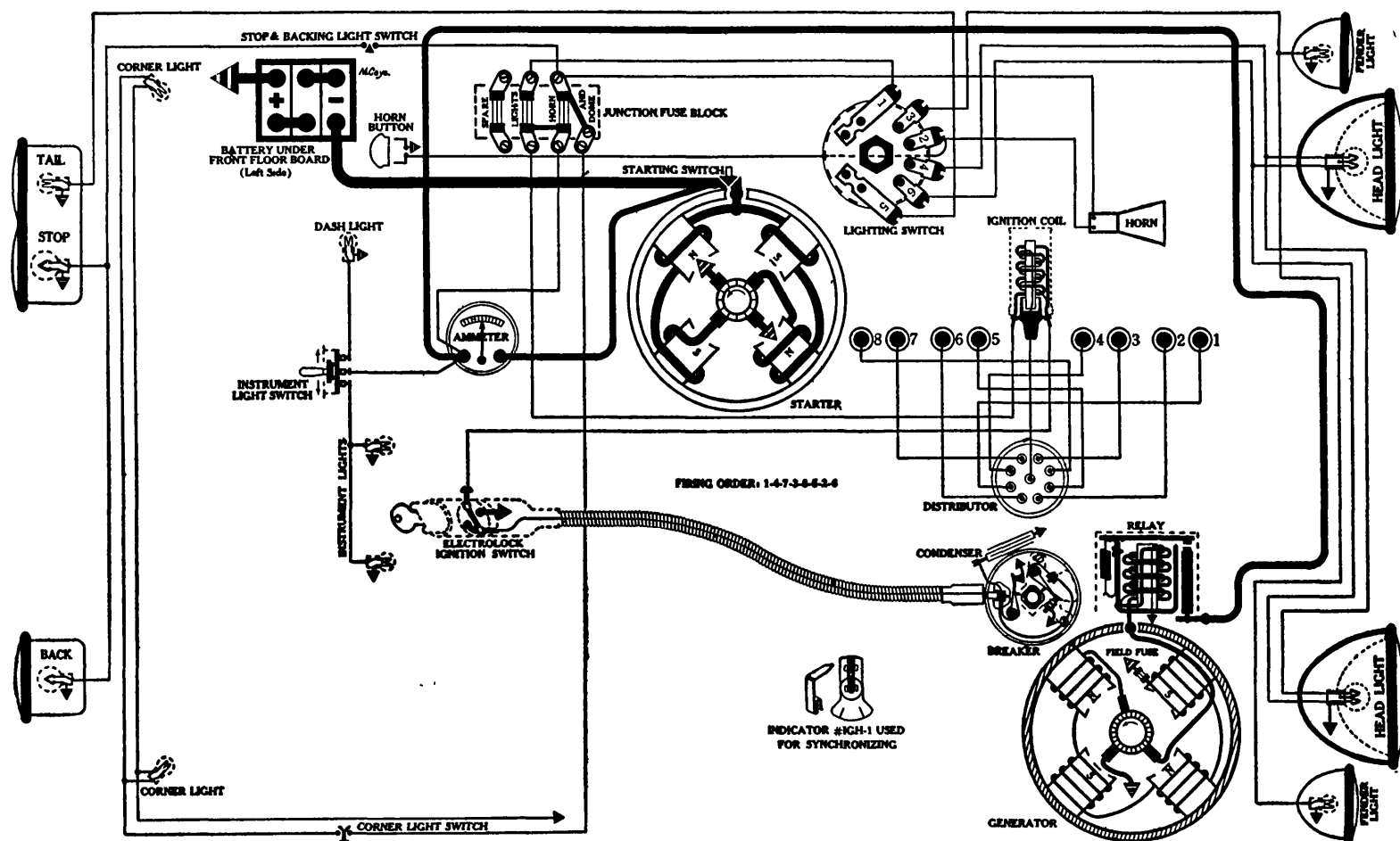
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two 10 amp. fuses with spare in box under hood (left side).

Lights—See P. 3, Sec. AA. **HEAD**—1110 (Bifocal); **FENDER**—63; **INSTRUMENT**—63; **CORNER**—63; **STOP**—87; **TAIL**—63.

HUPMOBILE

Models, "H" & "U", 130 H.P., Straight Eight, (1930)



BATTERY

Willard, WJ-4-15, 6 volts. Positive Terminal Grounded
Starting Capacity—145 amps. for 20 minutes.
Lighting Capacity—5 amps. for 26 hours.
Box—Length, 11 11/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MR-4102

Connection to Engine—Bendix drive.
Running Free—70 amps. at 5.8 volts.
Cranking Engine—190 amps. at 5.4 volts, 140 R.P.M.
Lock Torque—44 pound-feet, 820 amps., 4 volts.
Brush Spring Tension—20 to 24 oz. on each.
Starting Switch—Auto-Lite, SW-2725.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGH-4008

Breakers—Contact separation .020 inch.
Contact Spring Tension—17 to 19 oz. on each.
Timing—With No. 1 Piston on compression stroke, spark fully advanced, bring flywheel mark found 1 inch ahead of "1-8-DC" opposite pointer, rotor opposite No. 1 Dist. Cap Terminal; stationary set of breaker points should just open.
Spark Plugs—Metric (Champion No. 8); Gap .025 inch.
Firing Order—1-4-7-3-8-5-2-6.
Manual Advance—18 degrees (on Flywheel).
Automatic Advance—16 degrees (on Flywheel).
Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advanc
(on flywheel) (on cam)
800.....0.....400.....0
1000.....5.....500.....2.5
2400.....9.....1200.....4.5
3200.....14.....1600.....7
3600.....16.....1800.....8
Coil—Auto-Lite, CE-4001.

Ignition Switch—"Electrolock", Type 9-A. For theory of operation and instructions on servicing see P. 21, S c. AA.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAG-4118

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0.....	525.....	6.5	10.....	780.....	7.3
2.....	550.....	6.6	14.....	1200.....	7.7
5.....	650.....	7.	17.....	1250 (Max.) ..	8.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.
Max. Stall Current—17 to 19 amps. at 6 volts.
Field Test—4 amps. at 6 volts across field coils in series.
Field Fuse—7 1/2 amps.
Brush Spring Tension—20 to 24 oz. on each.
Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4012

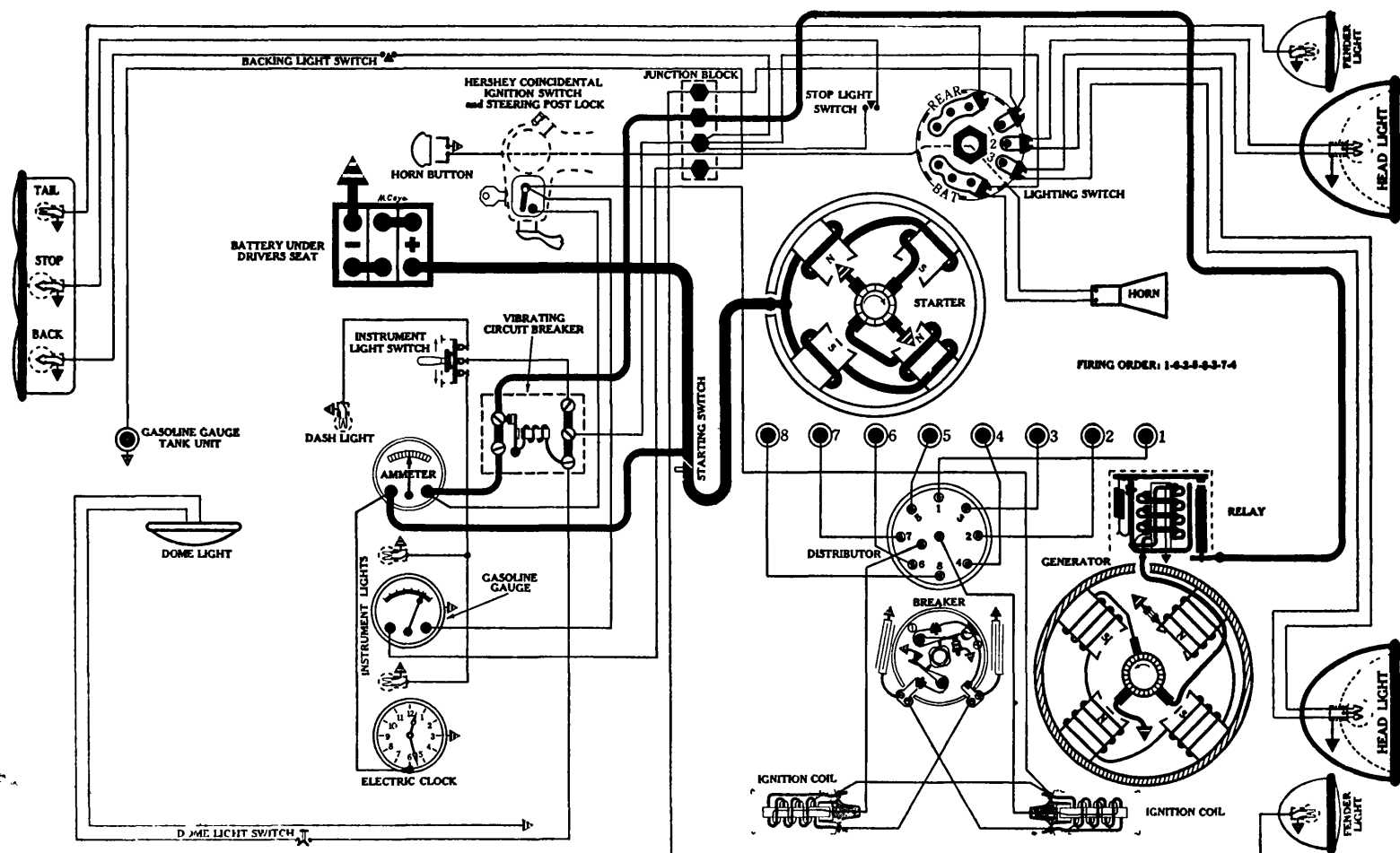
Closes—7 to 7 1/2 volts.
Opens—1/2 to 2 1/2 amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold No. 6050-A.
Location—Foot of steering column. Lights controlled by lever on st ring wheel.
Fuses—Two 10 amp. fuses with spar in box under hood (left side).
Lamps—See P. 3, S c. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; CORNER—63; STOP—87; TAIL—63; BACK—87.

JORDAN

Model 90, Straight Eight, (1930-31)



BATTERY

Willard, WS-2-15, 6 volts. Negative Terminal Grounded
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7 1/16; height, 8 3/4 inches.

STARTER

Rotation, R. H., Com. End
Auto-Lite, MUA-4007

Connection to Engine—Bendix drive

NOTE Gear reduction job A pinion cut on armature shaft drives a pinion on Bendix shaft

Running Free—70 amps. at 5 volts, 2500 R.P.M

Cranking Engine—185-195 amps. at 4.3 volts.

Lock Torque—27 pound-feet, 575 amps., 3 volts.

Brush Spring Tension—20 to 24 oz. on each.

Starting Switch—Auto-Lite, SW-4202.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGJ-4001-A

Breakers—Contact separation .022 inch.

Contact Spring Tension—18 to 20 oz. on each.

Timing—With No. 1 Cyl. on compression stroke, flywheel mark "IGN No 1" opposite pointer, spark fully advanced, rotor opposite No 1 Dist Cap Terminal; stationary breaker points should just open Adjustable points should open when flywheel mark "IGN No 6" is opposite pointer

Spark Plugs—Regular Metric (AC type G); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—24 degrees (on Flywheel).

Eng R.P.M	Degrees Advance (on flywheel)	Dist. R.P.M	Degrees Advance (on cam)
500	0-2	250	0-1
1200	8	600	4
2400	18	1200	9
3400	24	1700	12

Coils—Auto-Lite, IG-4078.

Ignition Switch—Hershey-Oakes Steering Ignition Lock —
Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAG-4109

Performance Data—Gen. cold.

Amps	R.P.M	Volts	Amps.	R.P.M.	Volts
0	525	6.5	10	780	7.3
2	550	6.6	14	1200	7.7
5	650	7.	17	1250	8.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—17 to 19 amps. at 6 volts.

Field Test—4 3 amps. at 6 volts across field coils in series.

Field Fuse—5 amps.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13,
P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4012

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold No. 5600-A.

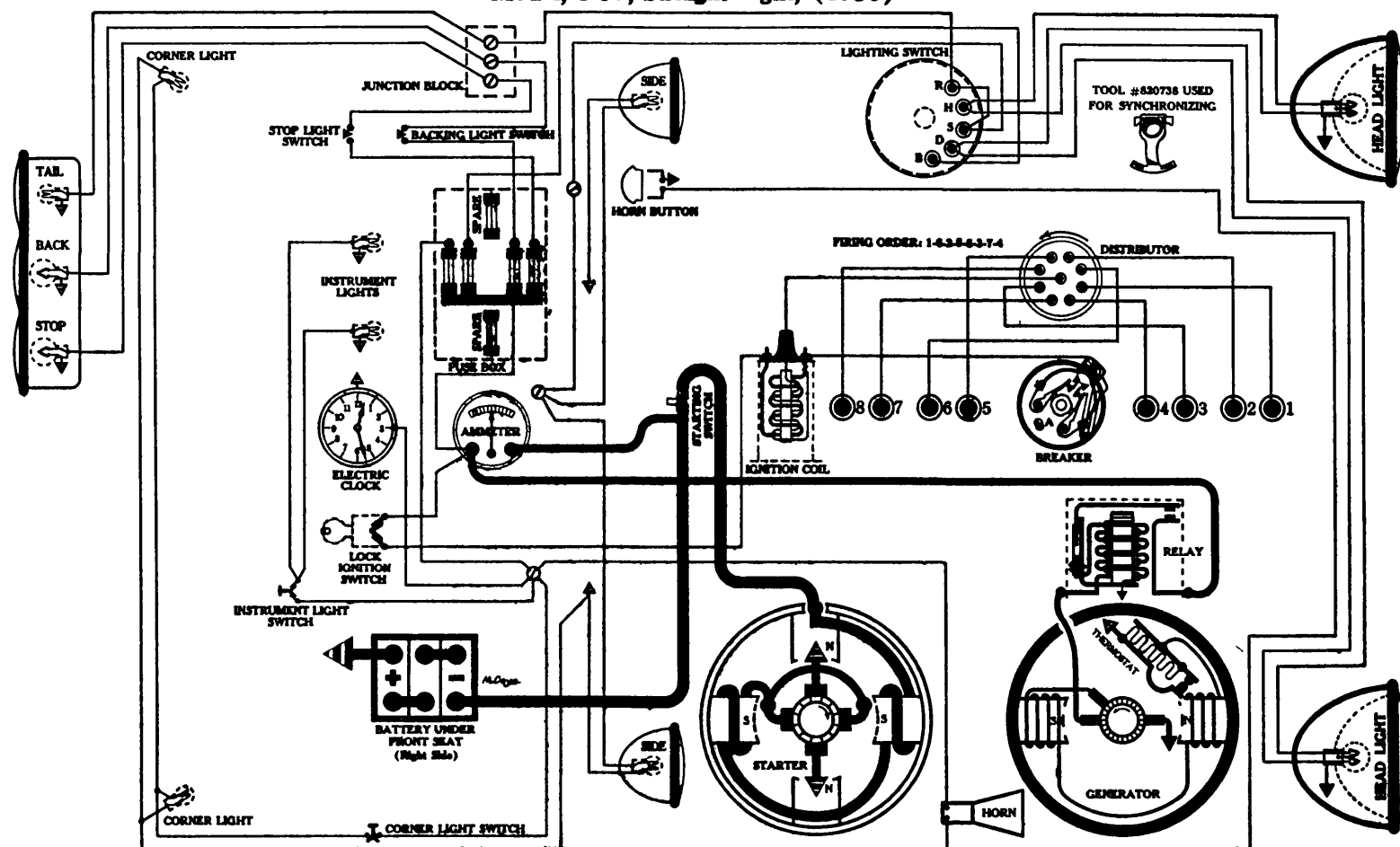
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Behind instrument board. Kellogg No. 568. Feed for horn, lighting switch, stop light, and inside lights, is taken thru this unit. Starts 25-30 amps. Operates 10-15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; STOP—87; INSTRUMENT—63; TAIL—63; DOME—63; BACK—87.

KISSEL

Model, 8-95, Straight Eight, (1930)

**BATTERY**

Willard, SJWR-4, 6 volts. Positive Terminal Grounded
 Starting Capacity—125 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 22 hours
 Box—Length, $10\frac{3}{8}$; width, $6\frac{3}{4}$; height, $9\frac{13}{16}$ inches.

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 716-A

Connection to Engine—Bendix drive.

NOTE Gear reduction job A 14 T pinion cut on armature shaft drives a 22 T pinion on Bendix shaft

Running Free—50 amps. at 5 volts, 4000 R.P.M.

Cranking Engine—175-180 amps. at 4.5 volts.

Lock Torque—14 pound-feet, 350 amps., 3.2 volts.

Brush Spring Tension—24-26 oz. on each.

Starting Switch—Delco-Remy, 406-A.

IGNITION

Rotation, L. H., Top View
 Delco-Remy, 658-L

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Timing—With No. 1 Piston on T.D.C., power stroke, spark fully retarded Rotor opposite No. 1 Dist Cap Terminal; stationary set of breaker points should just open

Spark Plugs— $\frac{7}{8}$ inch Long Body (Champion No. 4); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—33 degrees (on Flywheel).

Automatic Advance—15 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
300	0-1	150	0-5
1000	2.5-6.5	500	1.25-3.75
1800	13-16	900	6.5-8

Coil—Delco-Remy, 528-C.

Ignition Switch—Clum No. 4790 (Combined lock and switch).

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 955-H

Performance Data—Gen. cold. Thermostat closed.

Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE. Thermostat opens about 165° F, reducing charging rate approx 30-40 %

Motoring Freely—5-5½ amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4.75-5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum No. 10677.

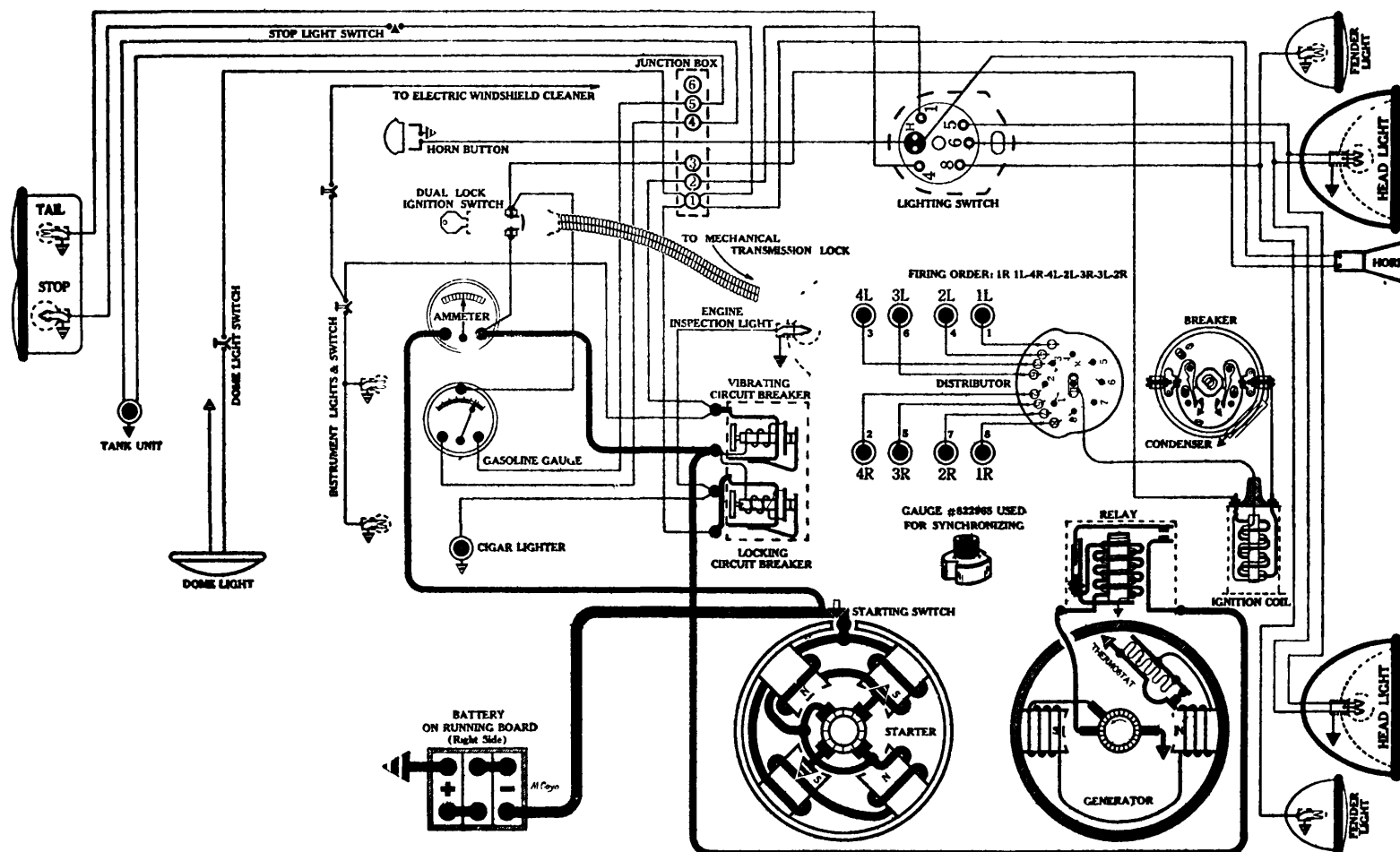
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Four, 10 amp. fuses with two spares in fuse box under engine hood (left side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; BODY—63; TAIL—63; STOP—87; BACK—87.

LA SALLE

Model, 340, (1930)



BATTERY

Exid, 3-MXV-15-1, 6 Volts. Positive Terminal Grounded
Starting Capacity—133 amps. for 20 minutes.
Lighting Capacity—5 amps. for 24 hours.
Box—Length, 10 9/32; width, 7; height, 9 21/32 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 728-D

Connection to Engine—Mechanical gear shift, incorporating an overrunning clutch, initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter. Gear reduction job.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—245-260 amps. at 4 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 16210.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 4050 or 4055 or 4056

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each

Timing—With No. 1L Piston on compression stroke, flywheel mark "IG A" opposite indicator, spark lever full advance (starting range), rotor opposite No. 1 Dist Cap Terminal, stationary breaker points should just open.

Firing Order—1R-1L-4R-4L-2L-3R-3L-2R.

Spark Plugs—Metric (AC Type G-10); Gap .025 inch.

Manual Advance—40 degrees (on Flywheel).

Automatic Advance—30 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
1000	0-2	500	0-1
1500	6-8	750	3-4
2500	14-16	1250	7-8
3000	22-24	1500	11-12
3800	28-30	1900	14-15

Coil—Delco-Remy, 530-B.

Ignition Switch—Delco-Remy, 426-L, 426-M, or 426-P "Dual Lock". (Combination Ignition Switch and Mechanical Transmission Lock)

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 927-D

Performance Data—Gen. cold Thermostat closed.

Amps	RPM	Volts
0	575	6.5
3	700	7
6	800	7.1
11	1000	7.9
15	1200	8.1
20	1450 (Max.)	8.3

NOTE Thermostat opens about 165° F, reducing charging rate approx 30-40%

Motoring Freely—3 1/2-4 amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—2.1 amp. at 6 volts, across field coils in series

Brush Spring Tension—16-20 oz. on each.

Third Brush Adjustment—Loosen Cover Band. See Fig. 13, P. 7, Sec. AA.

RELAY

Delco-Remy, 266-N

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch

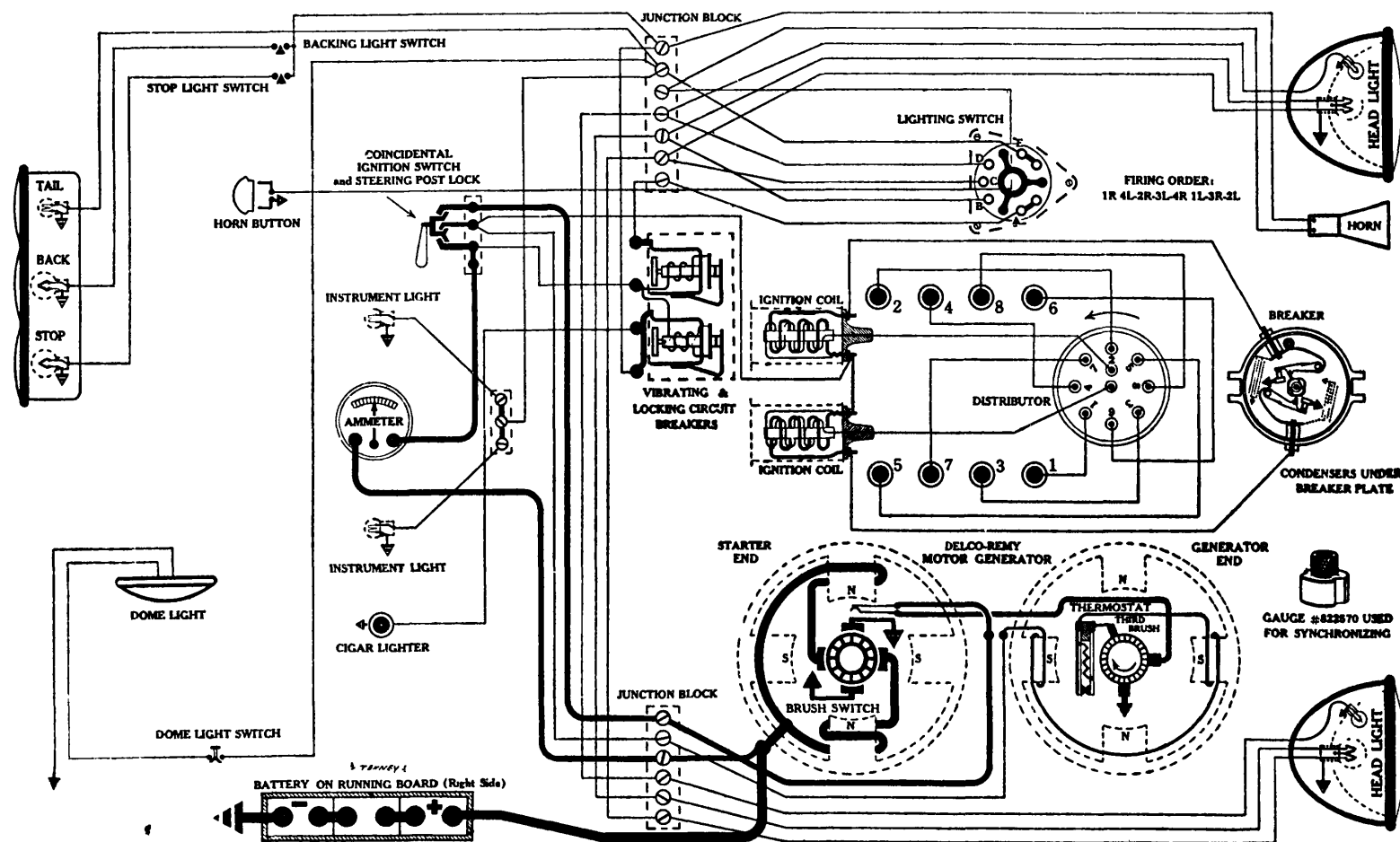
Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Same as Cadillac, Model, 353, (1930)

LINCOLN

Mod 1, "Vee" Eight, (1930)



BATTERY

Exide, 3-LXV-15-2G, 6 volts. Negative Terminal Grounded
Starting Capacity—150 amps. for 20 minutes.
Lighting Capacity—5 amps. for 29 hours.
Box—Length, 20 7/16; width, 5 1/2; height, 8 11/16 inches.

STARTER

Rotation, R. H., Facing Gen. Com. End
Delco-Remy Motor-Generator, 193

Connection to Engine—Thru reduction gears and manual shift. When ignition switch turned "ON", armature slowly revolves.

Running Free—60 amps., 4000 R.P.M. at 6 volts.

Cranking Engine—125-200 amps., 125 R.P.M., 5 volts at motor.

Lock Torque—10 pound-feet, 3.0 volts at motor.

Brush Spring Tension—24 to 28 oz. on each.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 4029

Breakers—Contact separation .018 inch.

Contact Spring Tension—18 to 20 oz. on each.

Timing—Right hand set of breaker points just open when No. 1 piston is 3/8 inch as measured on clutch ring, past upper dead center, compression stroke, spark lever fully retarded. The vertical mark immediately in front of letters "RET" on clutch ring will be opposite indicator, which can be seen by removing clutch housing cover.

Spark Plugs—7/8 inch regular, (Champion No. 3); Gap .025 inch.

Firing Order—1R-4L-2R-3L-4R-1L-3R-2L.

NOTE Cylinders on engine numbered as follows. From radiator back, Right Block—1-8-7-5, Left Block—6-8-4-2. High tension wires run from numbered terminals on Dist cap to corresponding numbers on cylinder block.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—28 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
1000	0	500	0
1500	6	750	3
2500	19	1250	9.5
2800	23	1400	11.5
3200	28	1600	14

Coils—Delco-Remy, 2195.

Ignition Switch—Hershey-Oakes Steering Ignition Lock — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, R. H., Com. End
Delco-Remy Motor-Generator, 193

Performance Data—Gen. cold. Thermostat closed.

Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	500	6.5	16	1000	7.7
6	600	7.2	18	1200	8
10	800	7.3	22	1400 (Max.)	8.2

NOTE Thermostat opens about 195° F, reducing charging rate approx 85-45%.

Motoring Freely—4 amps. at 6 volts.

Max. Stall Current—20 to 22 amps. at 6 volts.

Field Test—2 1/2 amps. at 6 volts.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 5, P. 6, Sec. AA.

RELAY

No relay used. Generator is connected directly to battery thru "Coincidental" ignition switch when "on".

LIGHTING

Switch—Delco-Remy No. 1318.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

Circuit Breakers—Delco-Remy 5778.

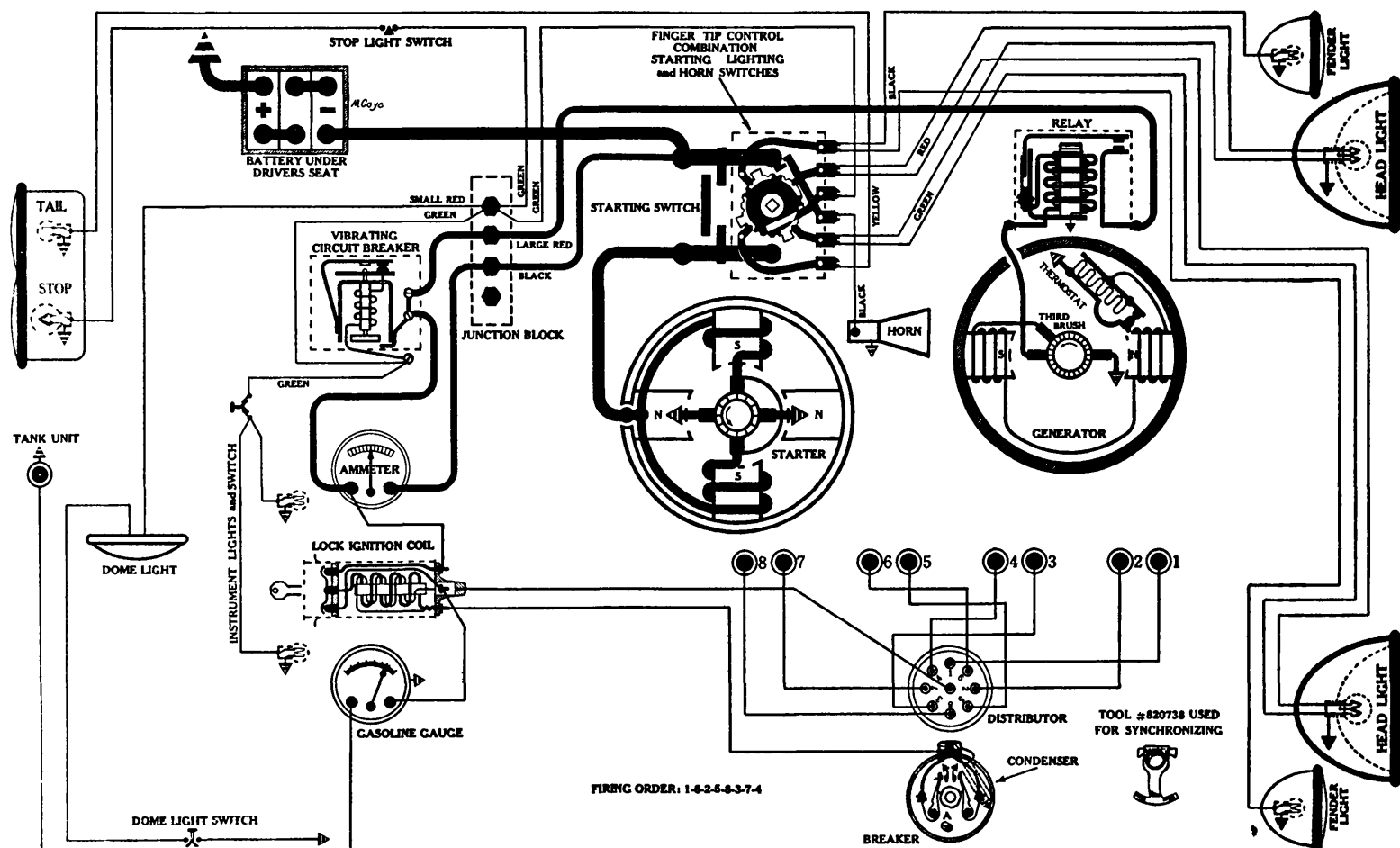
Vibrating—Starts 25-30 amps. Operates 10-15.

Lock-Out—Starts 25-30 amps. Operates with discharge less than 1 amp.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX.—81; INSTRUMENT—63; TAIL—63; DOME—63; STOP—87; BACK—87.

MARMON

Mod 1, 69, Straight Eight, (1930)



BATTERY

National, 15-RF, 6 volts. Positive Terminal Grounded

Starting Capacity—114 amps. for 20 minutes.

Lighting Capacity—5 amps. for 20 hours.

Box—Length, 10½; width, 7¼; height, 9⅞ inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-C

Connection to Engine—Bendix drive.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—175-180 amps. at 4.5 volts.

Lock Torque—12 pound-feet, 475 amps., 3.6 volts.

Brush Spring Tension—24-28 oz. on each.

Starting Switch—Located foot of steering column. Operated by pulling up on horn button.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 658-C

Breakers—Contact separation .020 inch

Contact Spring Tension—18 to 20 oz. on each

Timing—With No. 1 Piston on compression stroke, first bring flywheel mark "TDC 1 & 8" opposite pointer. Turn flywheel back a distance of two teeth. With spark fully retarded, rotor opposite No. 1 Dist Cap Terminal, stationary breaker points should just open.

Spark Plugs—⅞ inch (Champion No. 4); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—25 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist. RPM	Degrees Advance (on cam)
500	0-2.5	250	0-1 25
1000	5-10	500	2.5-5
2000	16.5 21.5	1000	8 25-10 25
2600	21.5-26.5	1300	10 75-13 25

Lock Ignition Coil—Delco-Remy, 526-P.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine. Coil has three "primary" terminals marked "Bat", "Gauge", and "Timer". Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 949-X (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps	R.P.M	Volts	Amps.	R.P.M	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19.	1700	8.3
11	1000	7.9			

Motoring Freely—5-5½ amps. at 6 volts.

NOTE: Thermostat opens about 165° F, reducing charging rate approx 80-40%

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4½ to 5 amps. at 6 volts, across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Aid Mfg. Co., No. 312.

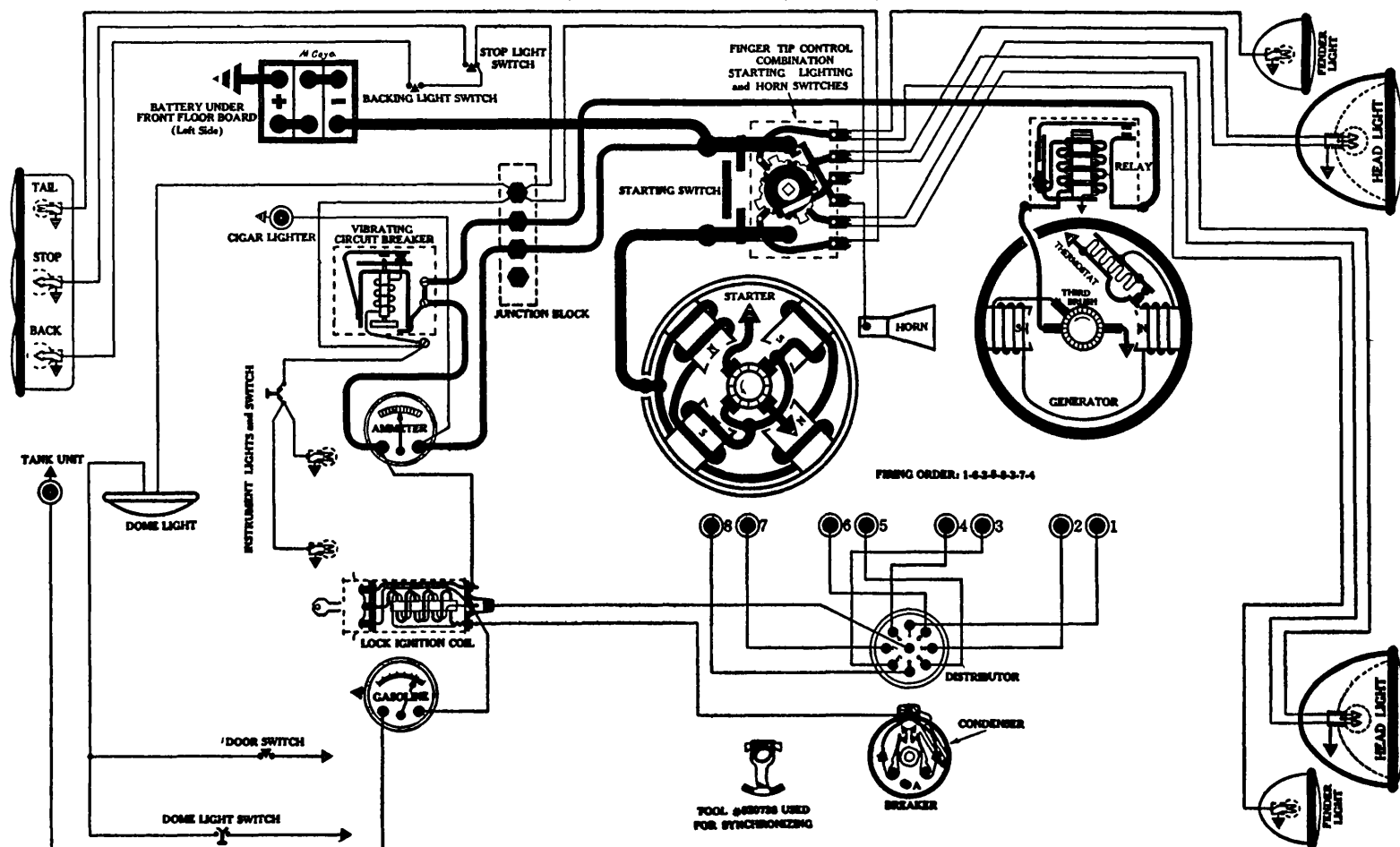
Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25-30 amps. Operates 10-15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110, (Bifocal); FENDER—63; INSTRUMENT—63; DOME—64; STOP—87; TAIL—63.

MARMON

Model, 79, Straight Eight, (1930)



BATTERY

National, 3-17-X, 6 volts. Positive Terminal Grounded
Starting Capacity—152 amps. for 20 minutes.
Lighting Capacity—5 amps. for 27 hours.
Box—Length, 13; width, 7¼; height, 9⅞ inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 718-M

Connection to Engine—Bendix drive.
Running Free—65 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—160-175 amps. at 4.3 volts.
Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
Brush Spring Tension—24-28 oz. on each.
Starting Switch—Located foot of steering column. Operated by pulling up on horn button.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 652-D

Breakers—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz. on each.
Timing—With No. 1 Piston on compression stroke, first bring flywheel mark "T.D.C. 1 & 8" opposite pointer. Turn flywheel back a distance of two teeth. With spark fully retarded, rotor opposite No. 1 Dist Cap Terminal, stationary breaker points should just open.
Spark Plugs—Metric (Champion No. 8); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).
Automatic Advance—20 degrees (on Flywheel).
Eng R P M Degrees Advance (on flywheel) Dist R P M Degrees Advance (on cam)

900	0	450	0
1200	3	600	1½
1800	8	900	4
2400	14	1200	7
2800	17	1400	8½
3100 (Max)	20	1550	10

Lock Ignition Coil—Delco-Remy, 526-P.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat", "Gauge", and "Timer". Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 949-F (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.					
Amps	R P M.	Volts	Amps	R P M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE: Thermostat opens about 165° F, reducing charging rate approx 30-40%.

Motoring Freely—5-5½ amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4.75-5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Aid Mfg. Co., No. 312.

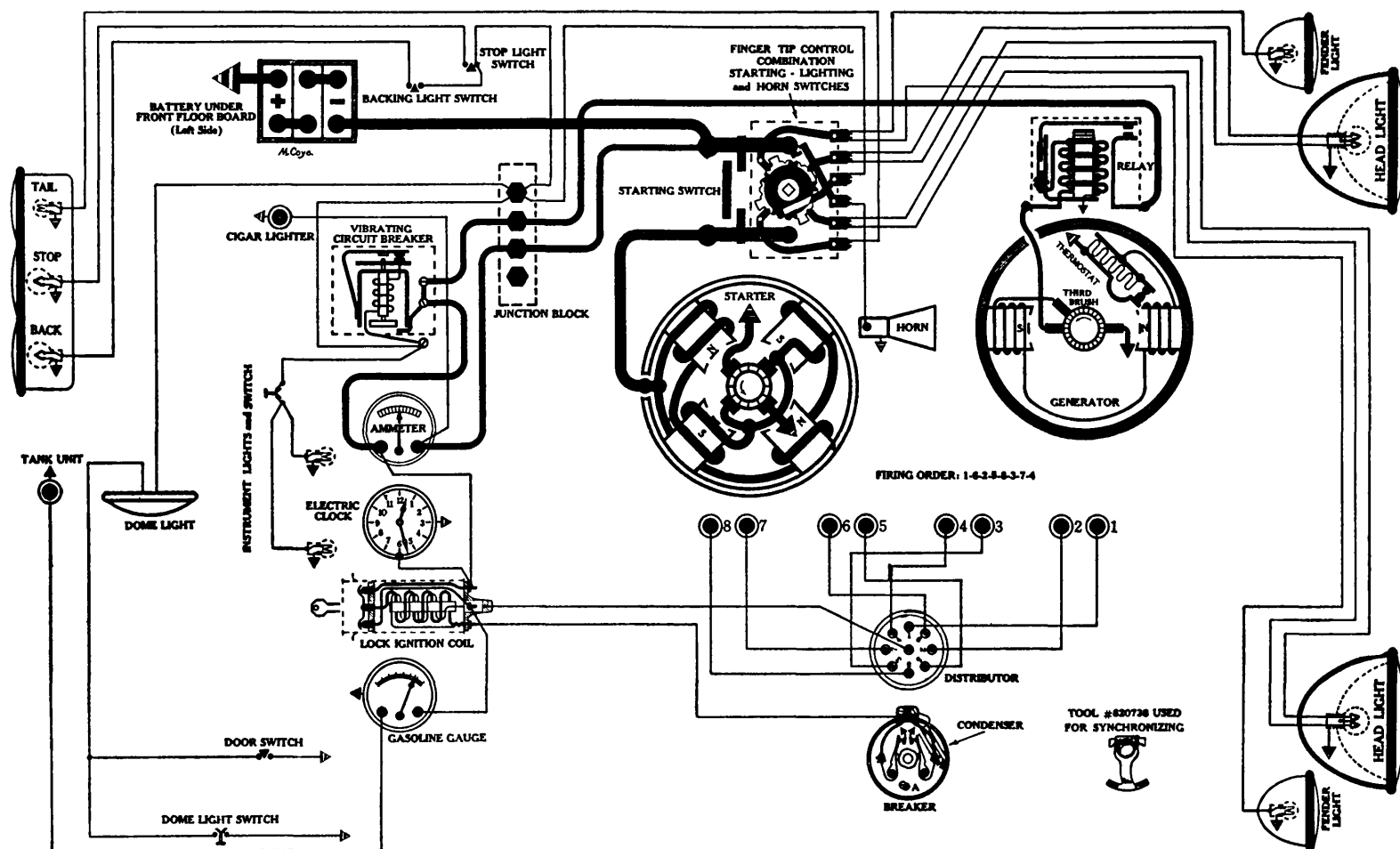
Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25-30 amps. Operates 10-15 amps.

Lamps—See P. 3, S c. AA. HEAD—1110, (Bifocal); FENDER—63; INSTRUMENT—63; DOME—64; STOP—1129; TAIL—63; BACK—1129.

MARMON

Mod 1, Big Straight Eight, (1930)



BATTERY

Exide, 3-MXC-19-1, 6 volts. Positive Terminal Grounded
Starting Capacity—171 amps. for 20 minutes.
Lighting Capacity—5 amps. for 31 hours.
Box—Length, 13 3/16; width, 7; height, 9 13/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 718-M

Connection to Engine—Bendix drive.
Running Free—65 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—160-175 amps. at 4.3 volts.
Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
Brush Spring Tension—24-28 oz. on each.
Starting Switch—Located foot of steering column. Operated by pulling up on horn button.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 652-D

Breakers—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz. on each.
Timing—With No. 1 Piston on compression stroke, first bring flywheel mark "T.D.C. 1 & 8" opposite pointer. Turn flywheel back a distance of two teeth. With spark fully retarded, rotor opposite No. 1 Dist. Cap Terminal, stationary breaker points should just open.
Spark Plugs—Metric (Champion No. 8); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—25 degrees (on Flywheel).
Automatic Advance—20 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
900	0	450	0
1200	3	600	1 1/2
1800	8	900	4
2400	14	1200	7
2800	17	1400	8 1/2
3100 (Max)	20	1550	10

Lock Ignition Coil—Delco-Remy, 526-P.

NOTE This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine. Coil has three "primary" terminals marked "Bat", "Gauge", and "Timer". Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 949-F (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE Thermostat opens about 165° F., reducing charging rate approx 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4.75-5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Aid Mfg. Co., No. 312.

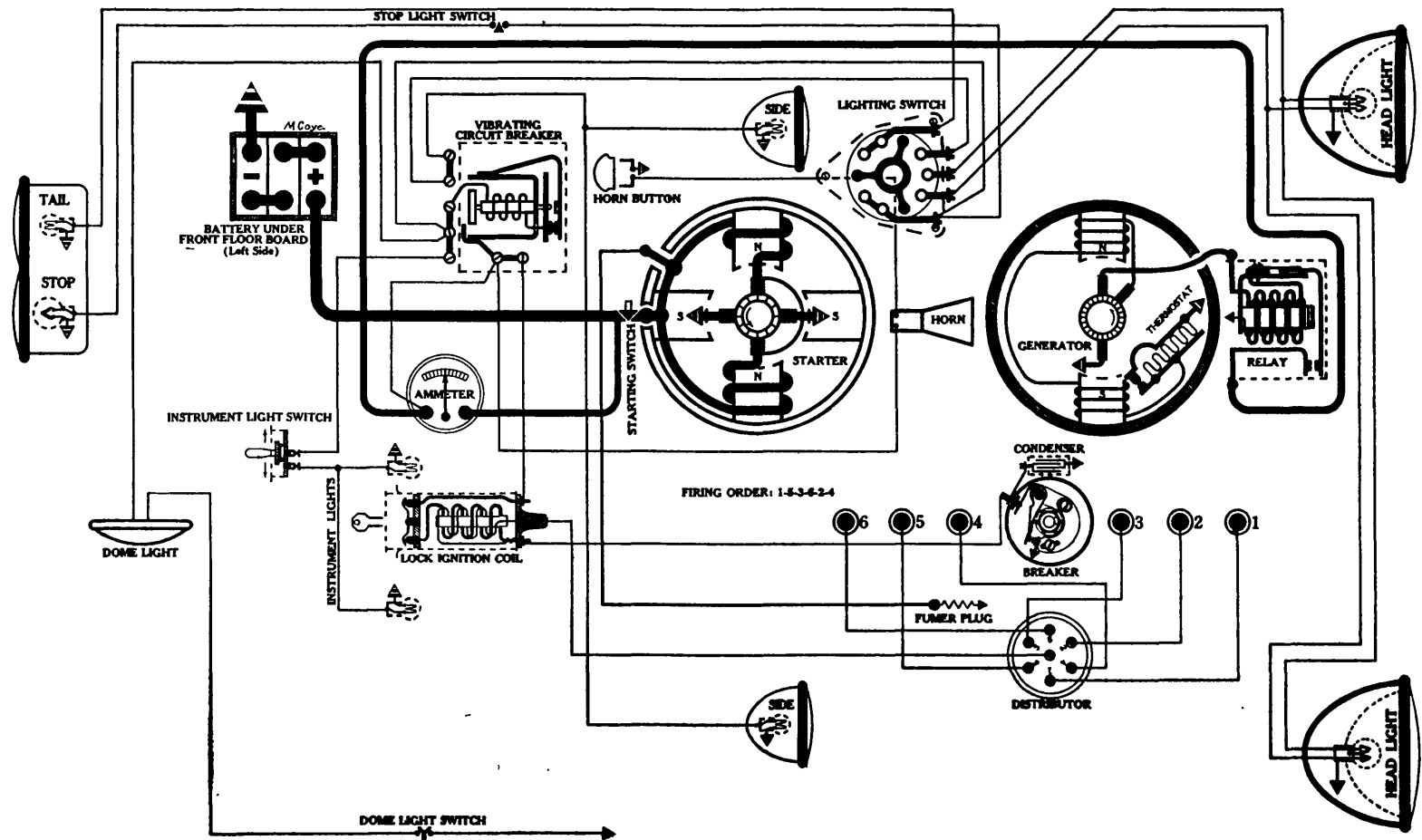
Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25-30 amps. Operates 10-15 amps.

Lamps—See P. 3, Sec. AA. **HEAD**—1110, (Bifocal); **FENDER**—63; **INSTRUMENT**—63; **DOME**—64; **STOP**—1129; **TAIL**—63; **BACK**—1129.

MARQUETTE

Mod 1, Series 30, 6 cyl., (1930)

**BATTERY**

Delco-Remy, 13-D-CU, 6 volts. Negative Terminal Grounded

Starting Capacity—102 amps. for 20 minutes.

Lighting Capacity—5 amps. for 17 hours.

Box—Length, 9 1/16; width, 7; height 9 1/4 inches.

STARTER

**Rotation, L. H., Com. End
Delco-Remy, 714-N**

Connection to Engine—Mechanical gear shift incorporating overrunning disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—160 to 180 amps. at 4.2 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

IGNITION

**Rotation, R. H., Top View
Delco-Remy, 639-Y**

Breaker—Contact separation .021 inch.

Contact Spring Tension—18 to 20 oz.

Timing—With No. 1 Piston on compression stroke, flywheel mark "ADV. 7°" opposite index line, spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal; breaker points should just open.

Spark Plugs—Metric (AC Type G-12); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—14 degrees (on Flywheel).

Automatic Advance—23 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0	300	0
800	2	400	1
1400	6	700	3
1800	10	900	5
2800	18	1400	9
3400	23	1700	11.5

Lock Ignition Coil—Delco-Remy, 528-Q.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 943-K (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.5	12	1300	7.8
5	875	7.1	14	1500	7.9
9	1100	7.5	18	1800 (Max.)	8.2

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—17 to 19 amps. at 6 volts.

Field Test—4 1/2 to 5 amps. at 6 volts, across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 266-P

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-B.

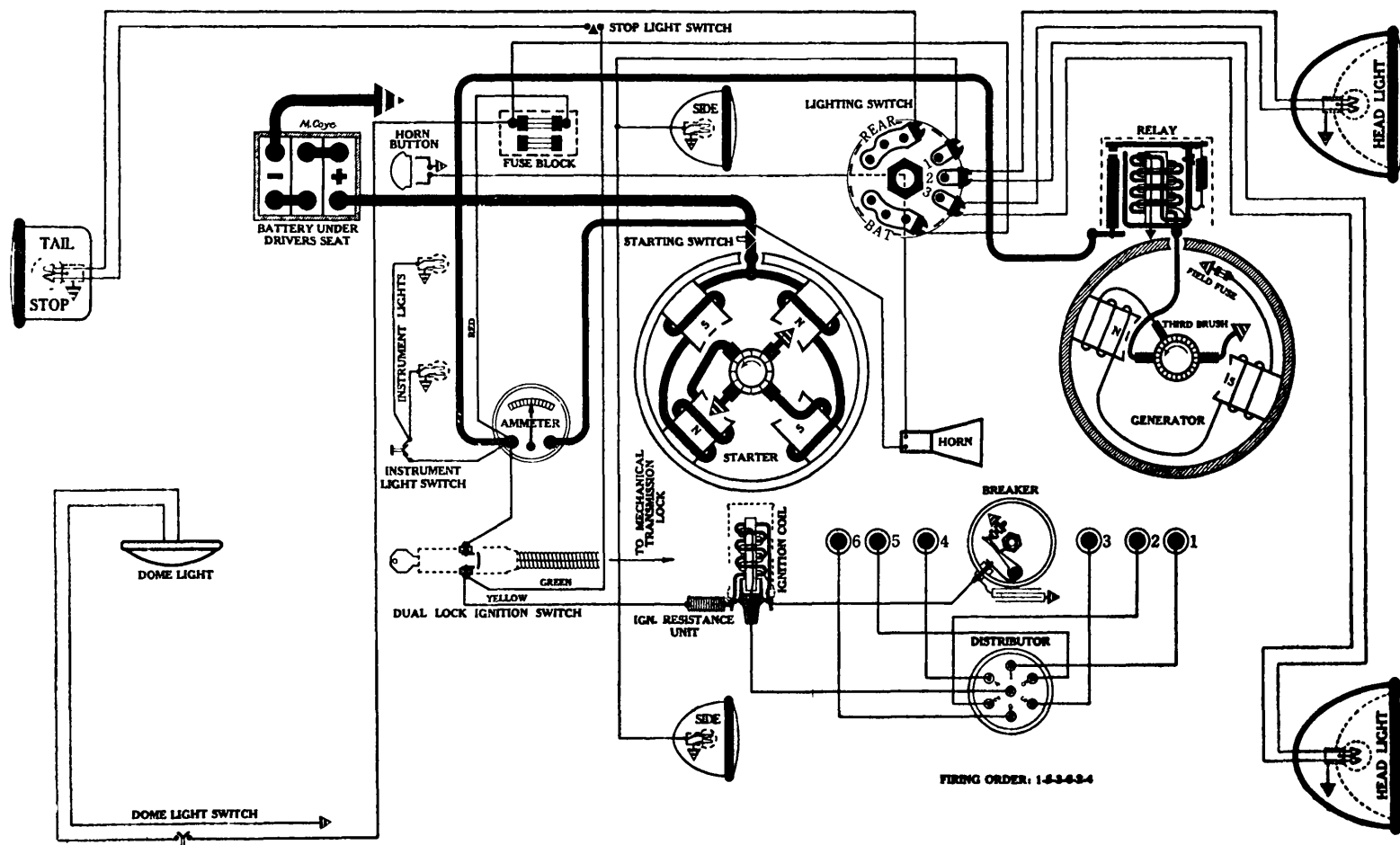
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-A. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See P. 3, Sec. AA. **HEAD**—1110 (Bifocal); **SIDE**—63; **TAIL**—63; **INSTRUMENT**—63; **DOME**—81; **STOP**—87.

NASH

Model, Single Ignition Six, 400 Series, (1930)



BATTERY

U. S. L., 3-HVX-5X-6, 6 volts. Negative Terminal Grounded

Starting Capacity—106 amps. for 20 minutes.

Lighting Capacity—5 amps. for 18 hours.

Box—Length, 9 1/16; width, 7 7/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4025

Connection to Engine—Bendix drive.

Running Free—60 amps. at 6 volts.

Cranking Engine—160-170 amps. at 5 volts.

Lock Torque—17 pound-feet, 520 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Mounted on starter. Operated by pull cable from instrument board.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGB-4015

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Contact Spring Tension—17 to 19 oz.

Timing—With No. 1 Piston on compression stroke, notch cut in flywheel opposite pointer, rotor opposite No. 1 Dist. Cap Terminal; breaker points should just open.

Spark Plugs—Metric (AC Type G-14); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—28 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0	300	0
1200	6	600	3
1800	12	900	6
2400	18	1200	9
3000	24	1500	12
3400 (Max)	28	1700	14

Coil—Auto-Lite, IG-4065.

Ignition Resistance Unit—Auto-Lite, IGB-2145.

Ignition Switch—Delco-Remy, 425-E, "Dual Lock" (combination ignition switch and mechanical transmission lock).

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4129 (Belt Drive)

Performance Data—Gen. cold.

Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	650	6.5	10	1075	7.3
2	720	6.6	14	1340	7.7
5	850	7.1	18	1800	8.0

Maximum Charging Rate (cold)—19 amps. at 8 volts or 17.75 amps. at 7.5 volts.

Motoring Freely—5 amps. at 6 volts.

Max. Stall Current—18 amps. at 6 volts.

Field Test—4.3 amps. at 6.2 volts directly across field coils in series.

Field Fuse—7 1/2 amps.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold No. 4210-A.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

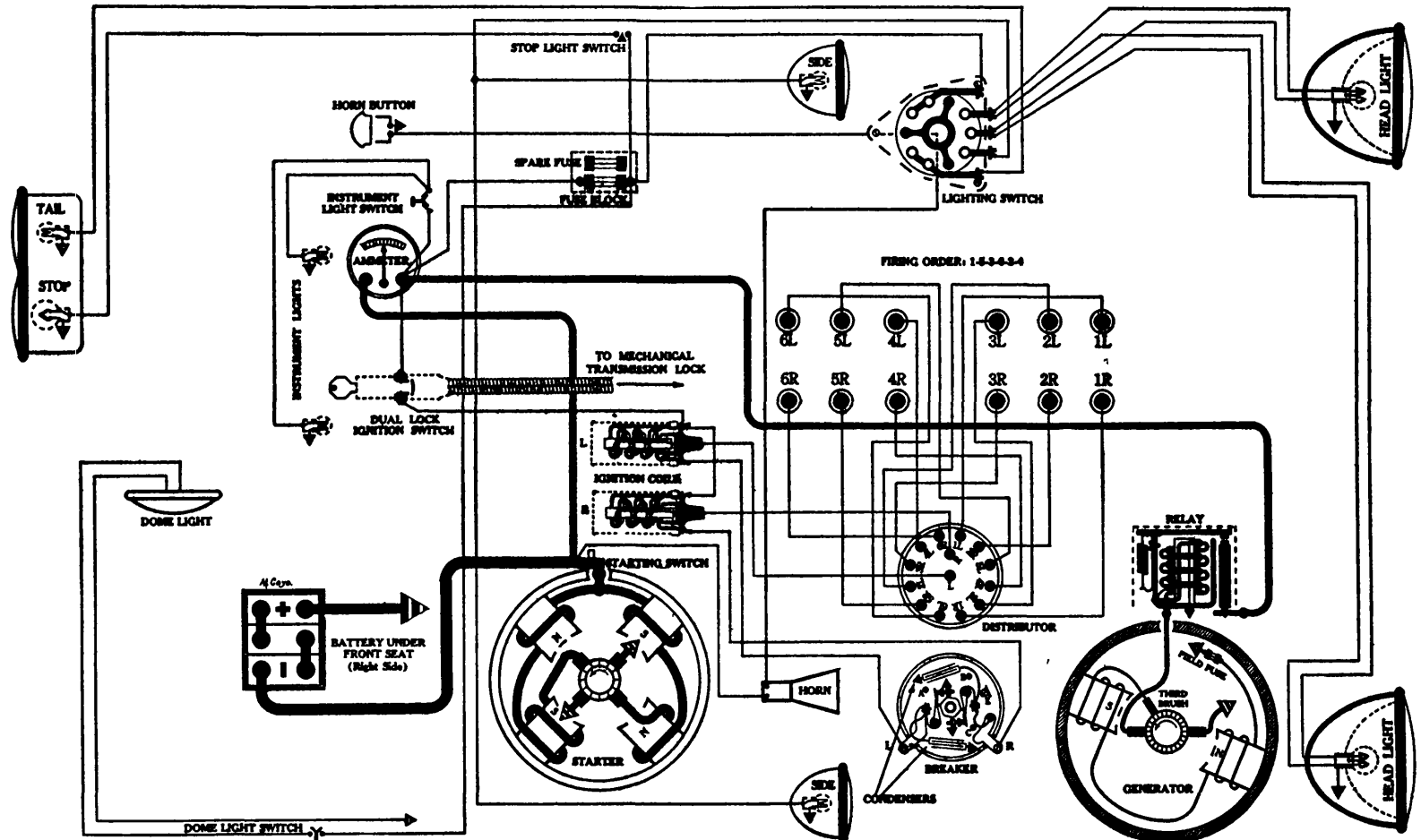
Fuses—Single 20 amp. fuse (with spare) mounted on dash, left side, under hood.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; DOME—64; INSTRUMENT—63; STOP and TAIL—1158.

NOTE: This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

NASH

Model, Twin Ignition Six, 400 Series, (1930)



BATTERY

U. S. L., 3-HVX-6X-6, 6 volts. Positive Terminal Grounded
 Starting Capacity—127 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 23½ hours.
 Box—Length, 10 7/16; width, 7 7/16; height, 9¾ inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAD-4107

Connection to Engine—Bendix drive.
 Running Free—50 amps. at 5.5 volts.
 Cranking Engine—160 amps. at 5.25 volts, 228 R.P.M.
 Lock Torque—13.6 pound-feet, 540 amps., 3 volts.
 Brush Spring Tension—20 to 24 oz. on each.
 Starting Switch—Mounted on starter. Operated by pull cable from instrument board.

IGNITION

Rotation, R. H., Top View
 Auto-Lite, IGE-4005

Breakers—Contact separation .020 inch.
 Contact Spring Tension—22 to 26 oz. on each.
 NOTE: Contact Spring Tension exceptionally heavy. This tension must be maintained to insure smooth running and high speed performance.
 Timing—With No. 1 Piston on compression stroke, spark fully advanced, notch cut in flywheel opposite pointer, rotor opposite No. 1 Dist Cap Terminal, stationary set of breaker points should just open.
 Spark Plugs—Metric (AC Type J); Gap .020 inch.
 Firing Order—1-5-3-6-2-4.
 Manual Advance—20 degrees (on Flywheel).
 Automatic Advance—25 degrees (on Flywheel).

Eng R P.M.	Degrees Advance (on flywheel)	Dist R P.M.	Degrees Advance (on cam)
600	1	300	7½
2000	14	1000	7
3000 (Max)	25	1500	12½

 Coils—Auto-Lite, IG-4065.
 Ignition Switch—Delco-Remy, 425-D, "Dual Lock" (combination ignition switch and mechanical transmission lock).

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAR-4104 (Belt Drive)

Performance Data—Gen. cold.

Amps	R P.M.	Volts	Amps	R P.M.	Volts
0	500	6.5	14	1200	8.
2	550	6.9	16	1300	8.1
6	800	7.3	18	1450 (Max)	8.3
10	1000	7.8			

Motoring Freely—5½ amps at 6 volts.
 Max. Stall Current—25 amps. at 6 volts.
 Field Test—5 amps. at 6 volts across field coils in series
 Field Fuse—7½ amps.
 Brush Spring Tension—20 to 24 oz. on each.
 Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

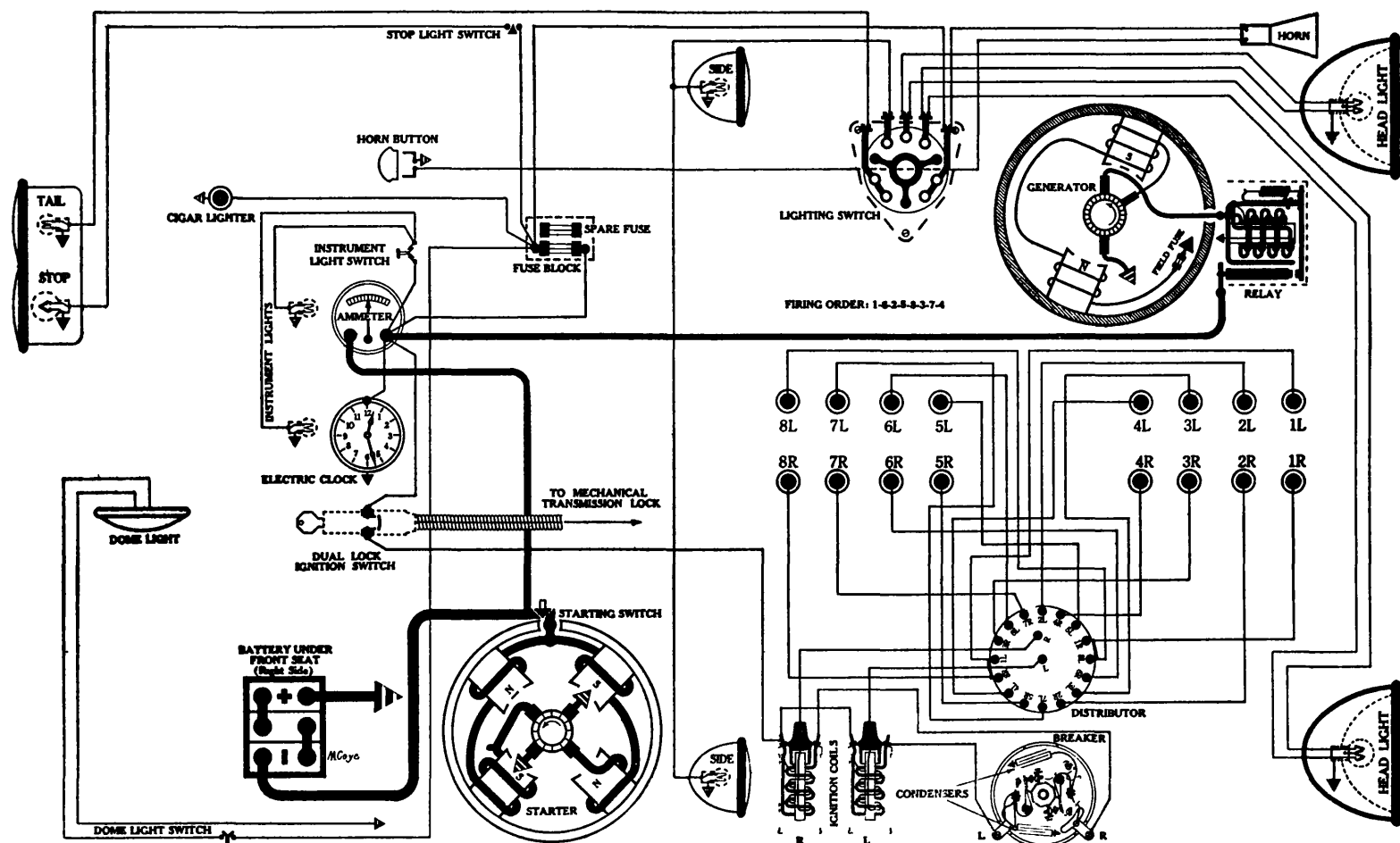
Closes—7 to 7½ volts.
 Opens—½ to 2½ amps. discharge.
 Contact Gap—.025 to .035 inch.
 Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-C.
 Location—Foot of steering column. Lights controlled by lever on steering wheel.
 Fuses—Single 20 amp. fuse (with spare) mounted on dash, left side, under hood.
 Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; STOP—87; TAIL—63; DOME—64.

NASH

Model, Twin Ignition Straight Eight. 400 Series, (1930)



BATTERY

U. S. L., 3-HVX-7X-6A, 6 volts. Positive Terminal Grounded

Starting Capacity—148 amps. for 20 minutes.

Lighting Capacity—5 amps. for 28 hours.

Box—Length, 11 3/4; width, 7 7/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite, MAB-4024

Connection to Engine—Bendix drive.

Running Free—60 amps. at 6 volts.

Cranking Engine—160-170 amps. at 5 volts.

Lock Torque—17 pound-feet, 520 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Mounted on starter. Operated by pull cable from instrument board.

IGNITION

Rotation, R. H., Top View

Auto-Lite, IGK-4001

Breakers—Contact separation .020 inch.

Contact Spring Tension—22 to 26 oz. on each.

NOTE: Contact spring tension exceptionally heavy. This tension must be maintained to insure smooth running and high speed performance.

Timing—With No. 1 Piston on compression stroke, spark fully advanced, notch cut in flywheel opposite pointer, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (AC Type J); Gap .020 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—38 degrees (on Flywheel).

Automatic Advance—16 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	0	200	0
800	4	400	2
1200	8	600	4
1600	12	800	6
2000 (Max)	16	1000	8

Coils—Auto-Lite, CE-4011.

Ignition Switch—Delco-Remy, 425-S, "Dual Lock" (combination ignition switch and mechanical transmission lock).

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4109 (Belt Drive)

Performance Data—Gen. cold.

Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	500	6.5	14	1200	8.
2	550	6.9	16	1300	8.1
6	800	7.3	18	1450 (Max)	8.3
10	1000	7.8			

Motoring Freely—5 1/2 amps. at 6 volts.

Max. Stall Current—25 amps. at 6 volts.

Field Test—5 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-K.

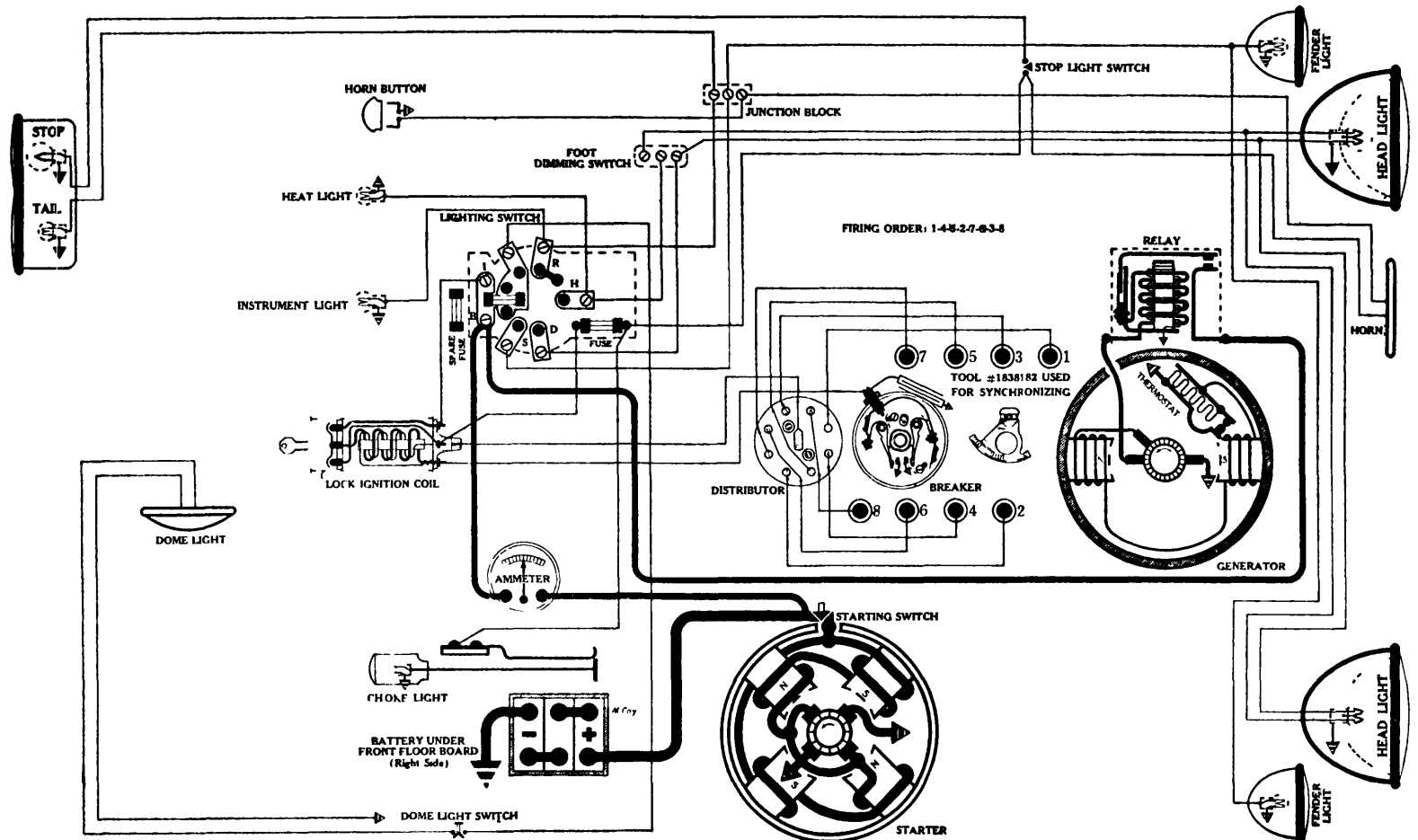
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (with spare) mounted on dash, left side, under hood.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; STOP—87; TAIL—63; DOME—64.

OAKLAND

Model, 101, "Vee" Eight, (1930)



BATTERY

Delco-Remy, 15-A-W, 6 volts. Negative Terminal Grounded
Starting Capacity—119 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 1/16; width, 7; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 726-H

Connection to Engine—Delco-Remy Mechanical Shift.
Running Free—65 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—180 to 185 amps. at 4.5 volts.
Lock Torque—15 pound-feet, 570 amps., 3.15 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 820052.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 660-A

(Full Automatic Spark Advance)

IMPORTANT NOTE: The 660 series of D.R. Distributors is new in 1930. A special new synchronizing tool has been developed for making adjustments. For detailed instructions in synchronizing see P. 32, Sec. AA.

Breakers—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz. on each.
Timing—With No. 1 Piston (left bank, nearest radiator) on T.D.C., power stroke, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—Metric (AC Type 12-G); Gap .025 inch.
Firing Order—1-4-5-2-7-6-3-8 (numbering from front to rear, odd numbers on left side).

Manual Advance—(None).

Automatic Advance—27 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist R.P.M.	Degrees Advance (n cam)
400	0	200	0
800	4	400	2
1200	9	600	4.5
2000	18	1000	9
2800	27	1400	13.5

Lock Ignition Coil—Delco-Remy, 526-R.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.", "Gauge", and "Timer". Coil must be connected

as marked. Feed for horn and stop light taken from "Gauge" terminal of coil.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 959-J (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.					
Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE: Thermostat opens about 165° F., reducing charging rate approx 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 266-P

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum No. 9067.

Location—Behind instrument board. Operated by pull knob.

Fuses—(Lighting) 20 amp. fuse mounted on switch back. (Stop and Horn) 20 amp. fuse mounted on switch support.

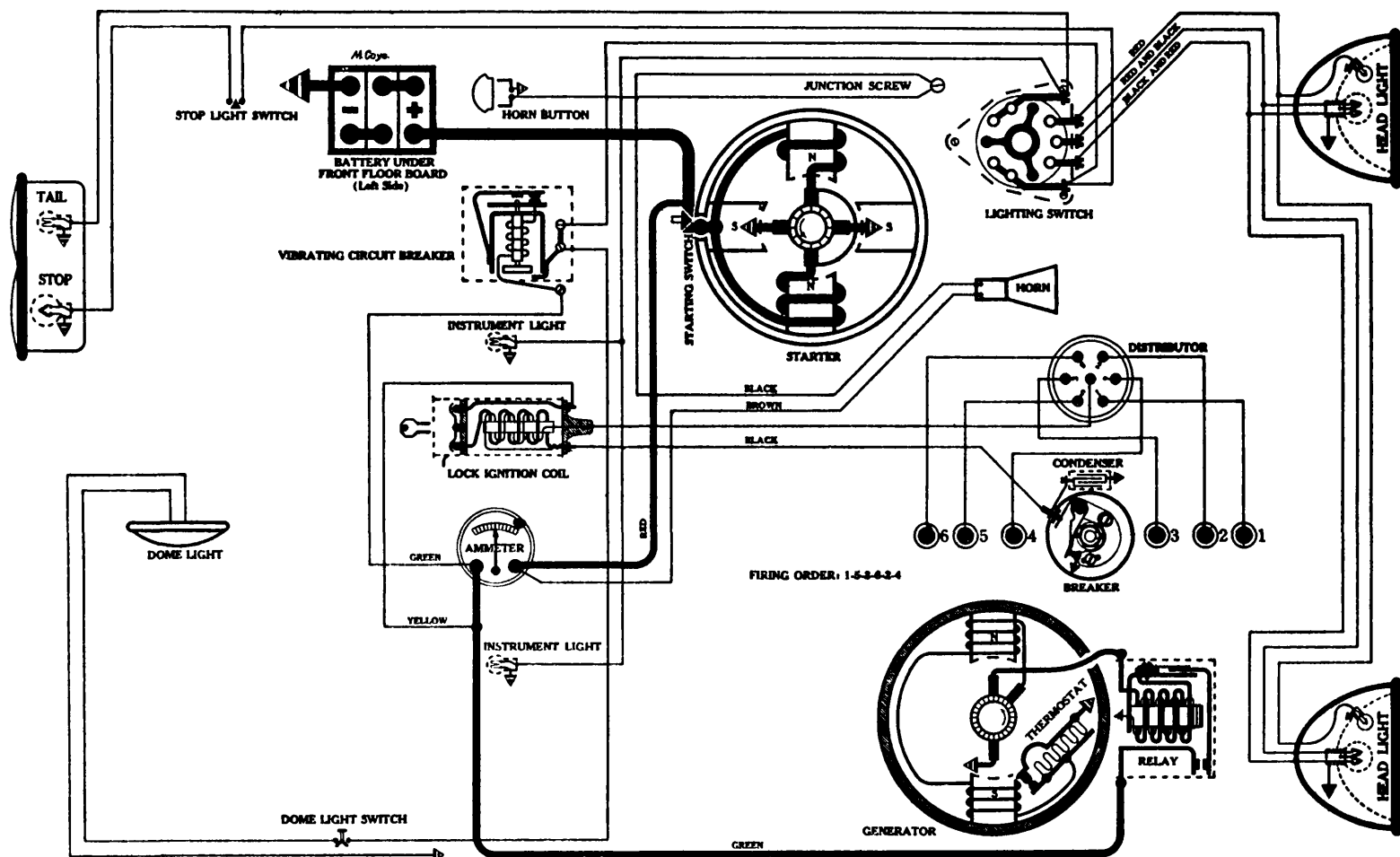
Foot Dimming Switch—Delco-Remy, 465-J.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger. Fender lights burn when beam is depressed.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; CHOKE LIGHT—63; STOP—87; DOME—63; TAIL—63.

OLDSMOBILE

Mod 1, F-30, 6 Cyl., (1930)



BATTERY

Willard, WSB-13, 6 volts. Negative Terminal Grounded
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17 hours.
Box—Length, 9 1/16; width, 7 1/16; height, 9 1/4 inches

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 714-H

Connection to Engine—Mechanical gear shift, incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—175-180 amps. at 4.5 volts.
Lock Torque—12 pound-feet, 475 amps., 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 820052.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 639-G
 (Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz.
Timing—With No. 1 Piston on T.D.C., power stroke, flywheel mark "1 & 6 T.D.C." opposite pointer, rotor opposite No. 1 Dist Cap Terminal, breaker points should just open.
Spark Plugs—Metric (AC Type G-12); Gap .025 inch.
Firing Order—1-5-3-6-2-4
Automatic Advance—24 degrees (on Flywheel)

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	0	200	0
800	4	400	2
1200	8	600	4
1800	14	900	7
2200	18	1100	9
2800	24	1400	12

Lock Ignition Coil—Delco-Remy, 528-P.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 949-W

Performance Data—Gen. cold. Thermostat closed.

Amps.	RPM	Volts	Amps.	RPM	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4.75-5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.
Opens—0 to 2 1/2 amps. discharge.
Contact Gap—.015 to .025 inch.
Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-B.

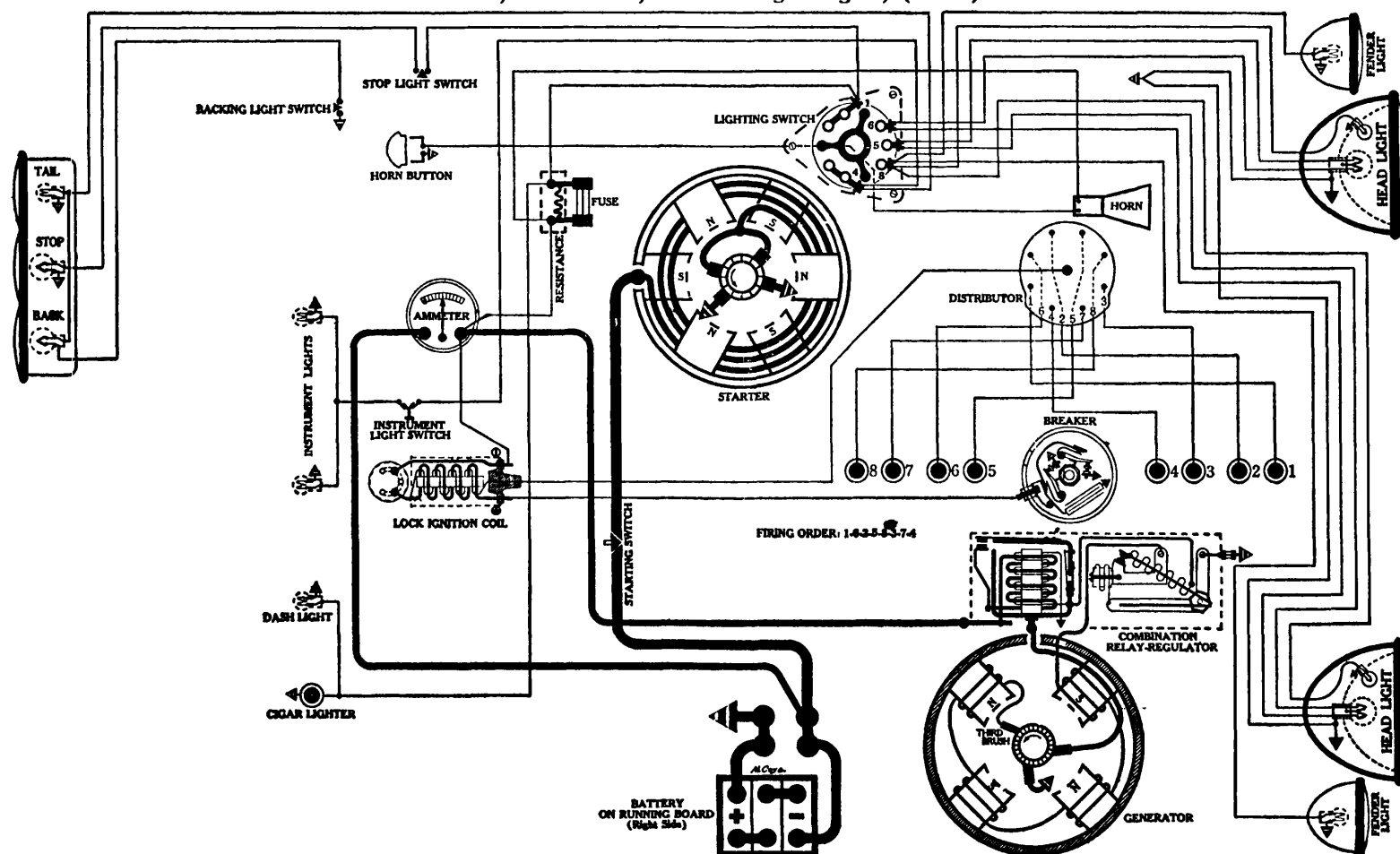
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts, 25-30 amps. Operates, 10-15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110, (Bifocal); AUX.—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

PACKARD

Models, 726 & 733, Small Straight Eights, (1930)



BATTERY

Prest-O-Lite, A-6-15-S, 6 volts. Positive Terminal Grounded
 Starting Capacity—155 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 26 hours.
 Box—Length, 11 9/16; width, 7; height, 9 5/8 inches.

STARTER

Rotation, L. H., Com. End
 Owen-Dyneto, Type DI-850

Connection to Engine—Bendix drive.
 Running Free—60 amps. at 6 volts, 4500 R.P.M.
 Cranking Engine—260 to 280 amps. at 4 volts.
 Lock Torque—25 pound-feet, 650 amps., 3 1/2 volts.
 Brush Spring Tension—26 to 28 oz. on each.

IGNITION

Rotation, R. H., Top View
 North East, Model TEU, Type 10868

NOTE: This unit uses an eight lobed cam with two sets of breaker points connected in parallel. They operate simultaneously and no provision is made for synchronizing.

Breakers—Contact separation .020 inch.
 Contact Spring Tension—18 to 20 oz. on each.
 Timing—With No. 1 Piston on compression stroke, spark fully advanced, bring flywheel mark "Spark 1" opposite pointer, with rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open. Flywheel mark "Spark 1" is 29/32 of an inch before "Upper D.C. No. 1".
 Spark Plugs—7/8 inch (Champion No. 3); Gap .025 inch.
 Firing Order—1-6-2-5-8-3-7-4.
 Manual Advance—38 degrees (on Flywheel).
 Automatic Advance—20 degrees (on Flywheel).
 Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance
 (on flywheel) (on cam)

300.....	0.....	400.....	0
1000.....	2.....	500.....	1
1200.....	5.....	600.....	2.5
1500.....	10.....	800.....	5
2000.....	16.....	1000.....	8
2200.....	20.....	1100.....	10

Lock Ignition Coil—North East No. 5022293.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, L. H., Com. End
 Owen-Dyneto, Type CD-865

IMPORTANT NOTE: The drive end generator bearing is part of engine. Do not run unit in test bench until special Dyneto bearing is attached.

Performance Data—Gen. cold. Charge regulator closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0.....	550.....	6.4	16.....	1000.....	7.7
4.....	600.....	7.	18.....	1400 (Max.).....	8.
10.....	800.....	7.3			

Motoring Freely—5 1/2 to 6 amps. at 6 volts.
 Max. Stall Current—26 to 28 amps. at 6 volts.
 Field Test—4 1/2 amps. at 6 volts across field coils in series.
 Field Fuse—5 amps. (mounted in charge regulator).
 Brush Spring Tension—20 to 22 oz. on each.
 Third Brush Adjustment—Remove cover cap. See Fig. 25, P. 7, Sec. AA.

CHARGE REGULATOR & RELAY

Owen-Dyneto, Type 20220

NOTE: For special instructions on theory of operation and how to service Regulator, see Sec. AA.

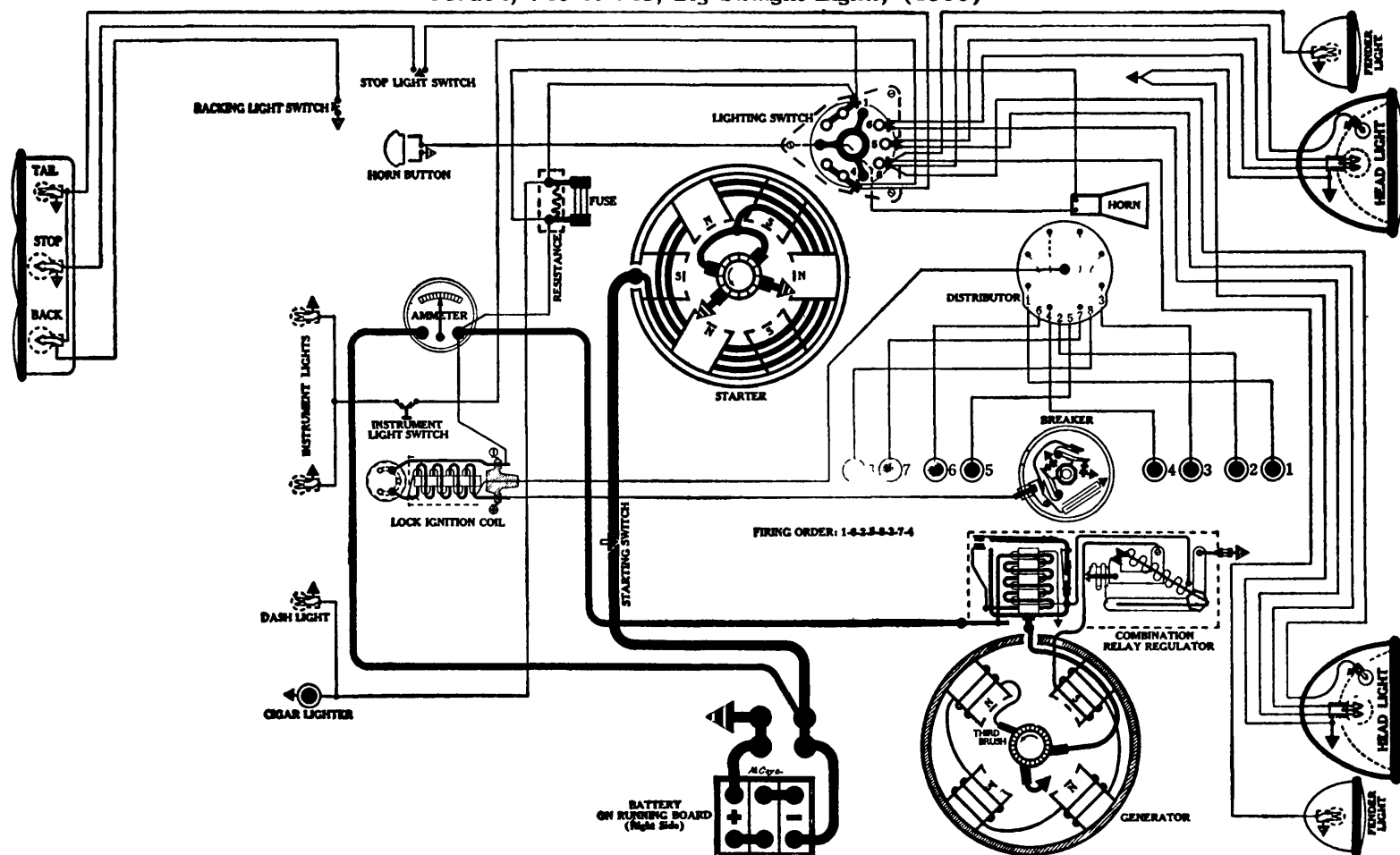
Relay Closes—6 1/2 to 7 volts.
 Opens—0 to 2 amps. discharge.
 Contact Gap—.015 inch.
 Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Packard own make No. 178009.
 Location—Foot of steering column. Lights controlled by lever on steering wheel.
 Fuse—20 amp. fuse mounted on North East Fuse Block and Resistance Assembly No. 5021100.
 Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; AUX.—63; INSTRUMENT—63; DOME—81; TONNEAU—63; TAIL—63; STOP—1129; BACK—1129; READING—63.

PACKARD

Models, 740 & 745, Big Straight Eights, (1930)



BATTERY

Prest-O-Lite, A-6-17-S, 6 volts. Positive Terminal Grounded
Starting Capacity—150 amps. for 20 minutes
Lighting Capacity—5 amps. for 32 hours.
Box—Length, 13; width, 7; height, 9 $\frac{5}{8}$ inches.

STARTER

Rotation, L. H., Com. End
Owen-Dyneto, Type DN-860

Connection to Engine—Bendix drive.
Running Free—50 amps. at 6 volts, 3000 R P.M.
Cranking Engine —290 to 300 amps. at 4 volts.
Lock Torque—35 pound-feet, 650 amps., 3.5 volts.
Brush Spring Tension—26 to 28 oz. on each.

IGNITION

Rotation, R. H., Top View
North East, Model TEU, Type 10868

NOTE This unit uses an eight lobed cam with two sets of breaker points connected in parallel. They operate simultaneously and no provision is made for synchronizing.

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each

Timing—With No. 1 Piston on compression stroke, spark fully advanced, bring flywheel mark "Spark 1" opposite pointer, with r t r opp site No. 1 Dist Cap Terminal, both sets of breaker points should just open. Flywheel mark "Spark 1" is 29/32 of an inch before "Upper D C No. 1"

Spark Plugs— $\frac{7}{8}$ inch (Champion No. 3); Gap .025 inch

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—38 degrees (on Flywheel)

Automatic Advance—20 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
800	0	400	0
1000	2	500	1
1200	5	600	2.5
1600	10	800	5
2000	16	1000	8
2200	20	1100	10

Lock Ignition Coil—North East No. 5022293.

NOTE This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, L. H., Com. End
Owen-Dyneto, Type CD-865

IMPORTANT NOTE: The drive end generator bearing is part of engine. Do not run unit in test bench until special Dyneto bearing is attached.

Performance Data—Gen. cold. Charge regulator closed

Amps	RPM	Volts	Amps	RPM	Volts
0	550	6.4	16	1000	7.7
4	600	7	18	1400 (Max)	8
10	800	7.3			

Motoring Freely—5 $\frac{1}{2}$ to 6 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—4 $\frac{1}{2}$ amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (mounted in charge regulator).

Brush Spring Tension—20 to 22 oz. on each.

Third Brush Adjustment—Remove cover cap. See Fig 25, P. 7, Sec. AA.

CHARGE REGULATOR & RELAY

Owen-Dyneto, Type 20220

NOTE For special instructions on theory of operation and how to service Regulator, see Sec. AA

Relay Closes—6 $\frac{1}{2}$ to 7 volts.

Opens—0 to 2 amps. discharge

Contact Gap—.015 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Packard own make No. 178009

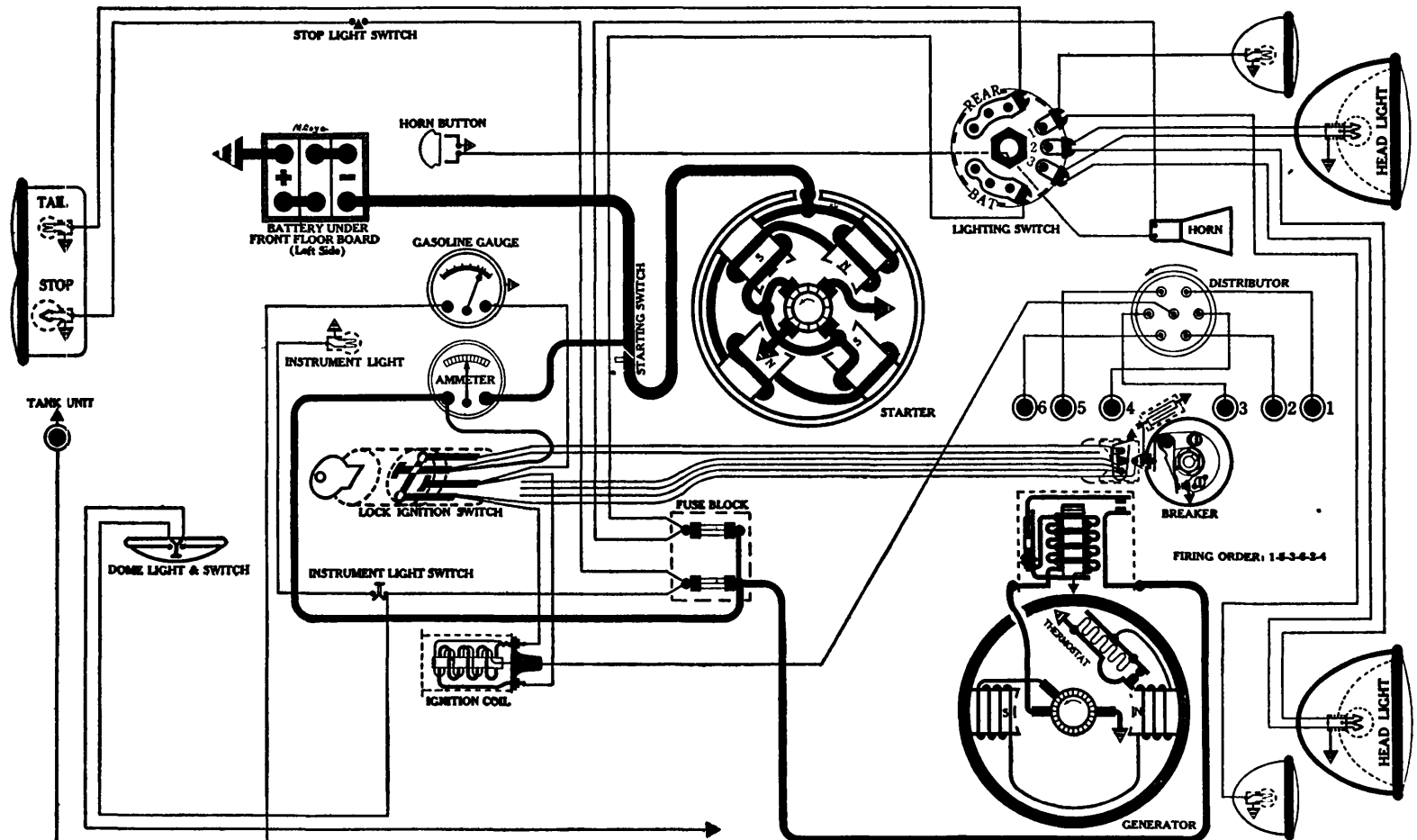
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuse—20 amp. fuse mounted on North East Fuse Block and Resistance Assembly No. 5021100.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal), FENDER—63; AUX.—63; INSTRUMENT—63; DOME—81; TONNEAU—63; TAIL—63; STOP—1129; BACK—1129; READING—63.

PEERLESS

Model, 61-A, 6 cyl., (1930)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17 hours.
Box—Length, 9 1/16; width, 7 1/16; height, 8 7/8 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 718-H

Connection to Engine—Bendix drive.
Running Free—65 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—160-175 amps. at 4.3 volts.
Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 406-K.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 631-F

Breaker—Contact separation .022 inch.
Contact Spring Tension—18 to 20 oz.
Timing—With No. 1 Piston on compression stroke, flywheel mark "IGN" opposite indicator, spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal; breaker points should just open.
Spark Plugs—7/8 inch Long Body (Champion No. 4); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Manual Advance—28 degrees (on Flywheel).
Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	0-2	200	0-1
1200	6-8	600	3-4
2000	14-16	1000	7-8
2800	18-20	1400	9-10

Coil—Delco-Remy, 528-C.

Ignition Switch—Shaler Lock Switch with round type "Thief Trap." For details of operation and instructions on servicing see Pages 19 and 23, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 949-V

Performance Data—Gen. cold. Thermostat closed.					
Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3...	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4.75-5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.
Opens—0 to 2 1/2 amps. discharge.
Contact Gap—.015 to .025 inch.
Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold No. 2800-A.

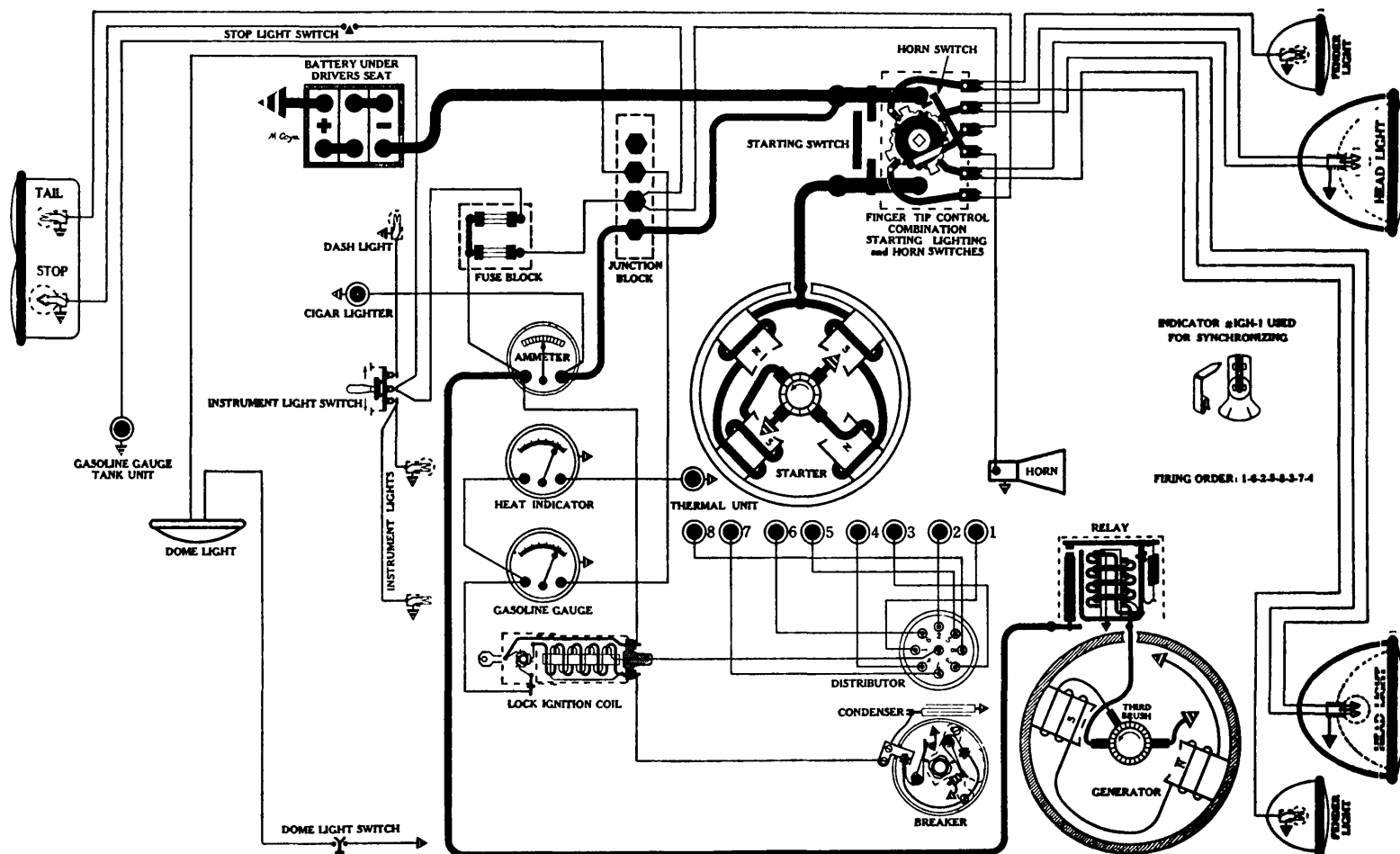
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two 20 amp. fuses mounted on dash (driver's side).

Lamps—See P. 3, Sec. AA. **HEAD**—1110 (Bifocal); **FENDER**—63; **INSTRUMENT**—63; **DOME**—63; **TAIL**—63; **STOP**—87.

PEERLESS

Model, Standard "A", Straight Eight, (1930)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7 1/16; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4029

Connection to Engine—Bendix drive
Running Free—60 amps at 6 volts
Cranking Engine—160-170 amps. at 5 volts.
Lock Torque—17 pound-feet, 520 amps at 3 volts
Brush Spring Tension—24 to 28 oz. on each
Starting Switch—Located foot of steering column. Operated by pulling up on horn button.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGH-4011-A

Breakers—Contact separation .020 inch
Contact Spring Tension—17 to 19 oz. on each.
Timing—With No. 1 Piston on compression stroke bring flywheel mark "IGN" (which is 3/8 inch before TDC) opposite pointer, spark lever fully advanced, rotor opposite No. 1 Dist Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—Metric (Champion No. 10); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).
Automatic Advance—20 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
800	0	400	0
1600	6	800	3
2400	11	1200	5.5
3200	17	1600	8.5
3600	20	1800	10

Lock Ignition Coil—Auto-Lite, CE-4013.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4134

Performance Data—Gen. cold.

Amps	RPM	Volts	Amps	RPM	Volts
0	650	6.5	10	1075	7.3
2	720	6.6	14	1340	7.7
5	850	7.0	16	1800	8.0

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—16-19 amps. at 6 volts.

Field Test—4 1/2 amps at 6 volts across field coils in series

Field Fuse—(None).

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps discharge.

Contact Gap—0.025 to 0.035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Aid Mfg. Co., No. 312.

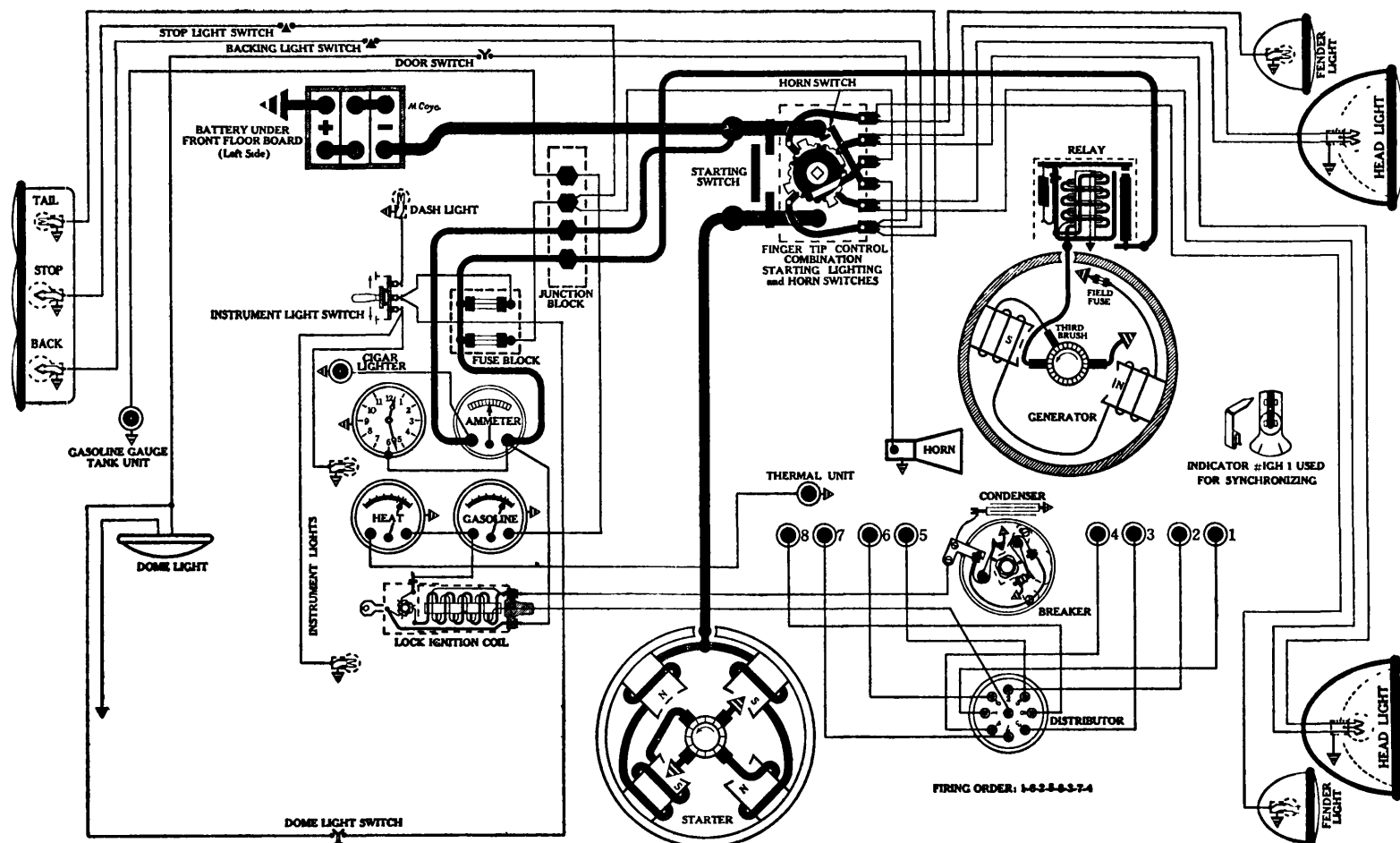
Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.

Fuses—Two 20 amp. fuses mounted on dash (driver's side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—63; TAIL—63; STOP—87

PEERLESS

Models, Master "B" and Custom "C", Straight Eights, (1930)



BATTERY

Willard, WSB-19, 6 volts. Positive Terminal Grounded
Starting Capacity—146 amps. for 20 minutes.
Lighting Capacity—5 amps. for 27 hours.
Box—Length, 13; width, 7 1/16; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, ML-4146

Connection to Engine—Bendix drive.
Running Free—60 amps. at 6 volts.
Cranking Engine—160-170 amps. at 5 volts.
Lock Torque—17 pound-feet, 520 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Located foot of steering column. Operated by pulling up on horn button.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGH-4010

Breakers—Contact separation .020 inch.
Contact Spring Tension—17 to 19 oz. on each.
Timing—With No. 1 Piston on compression stroke bring flywheel mark "IGN" (which is 3/4 inch before T D C) opposite pointer, spark lever fully advanced, rotor opposite No. 1 Dist Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—Metric (Champion No. 10); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—25 degrees (on Flywheel).
Automatic Advance—20 degrees (on Flywheel).
Eng. R.P.M. Degrees Advance (on flywheel) Dist R.P.M. Degrees Advance (on cam)

800	0	400	0
1600	6	800	3
2400	11	1200	5 5
3200	17	1600	8 5
3600	20	1800	10

Lock Ignition Coil—Auto-Lite, CE-4013.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAR-4111

Performance Data—Gen. cold.

Amps	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	650	6.5	10	1075	7.3
2	720	6.6	14	1340	7.7
5	850	7.	16	1800.	8

Motoring Freely—5 to 5 1/2 amps. at 6 volts.
Max. Stall Current—16 to 19 amps. at 6 volts.
Field Test—5 amps. at 6 volts across field coils in series.
Field Fuse—7 1/2 amps.
Brush Spring Tension—20 to 24 oz. on each.
Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

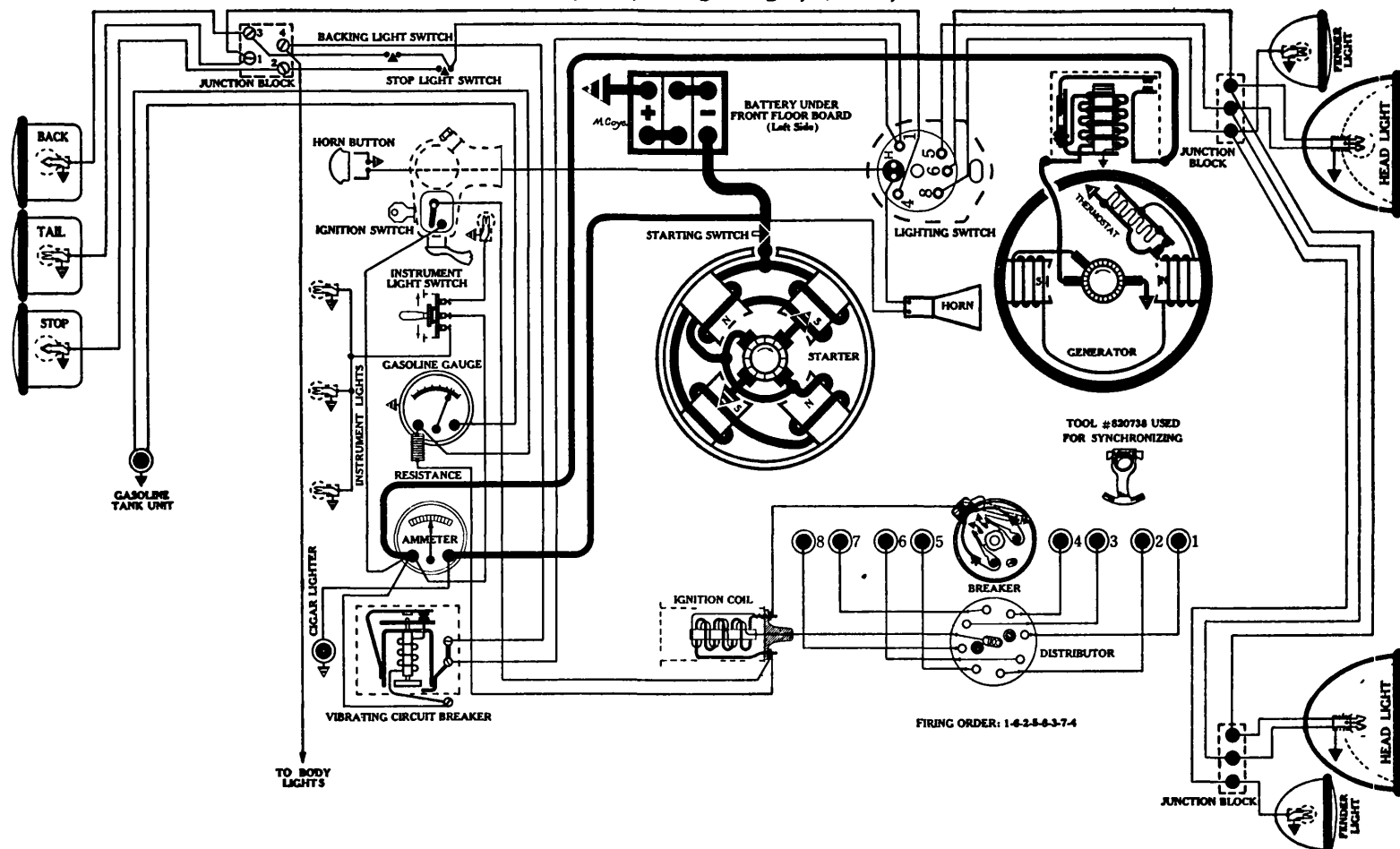
Closes—7 to 7 1/2 volts.
Opens—1/2 to 2 1/2 amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Aid Mfg. Co., No. 312.
Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.
Fuses—Two 20 amp. fuses mounted on dash (driver's side).
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—63; TAIL—63; STOP—67; BACK—87.

PIERCE-ARROW

Model, 132, Straight Eight, (1930)



BATTERY

Willard, WJ-4-15, 6 volts. Positive Terminal Grounded
Starting Capacity—145 amps. for 20 minutes.
Lighting Capacity—5 amps. for 26 hours
Box—Length, 11 11/16; width, 7 1/16, height, 9 1/4 inches

STARTER

Rotation, R. H., Com. End
Delco-Remy, 728-C

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on starter. This is a gear reduction job, a pinion being cut on the armature shaft.

Running Free—70 amps at 5 volts, 2500 R.P.M.
Cranking Engine—150-160 amps. at 4.4 volts
Lock Torque—28 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 16210.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 652-E

Breakers—Contact separation .022 inch
Contact Spring Tension—18 to 20 oz. on each.
Timing—With No. 1 Piston on T.D.C., power stroke, spark fully retarded, rotor opposite No. 1 Dist. Cap Terminal, station any set of breaker points should just open.
Spark Plugs—3/8 inch Regular (Champion No. 4); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—23 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
600	0	300	0
1000	4	500	2
1500	8	750	4
2500	15	1250	7.5
3200	20	1600	10

Coil—Delco-Remy, 528-E.

Ignition Switch—Hershey-Oakes Steering Ignition Lock — Combination Ignition Switch and Steering Post Lock

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 959-F (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps	RPM	Volts	Amps	RPM	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE: Thermostat opens about 165° F. reducing charging rate approx. 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Field Test—4.75-5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 266-P

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

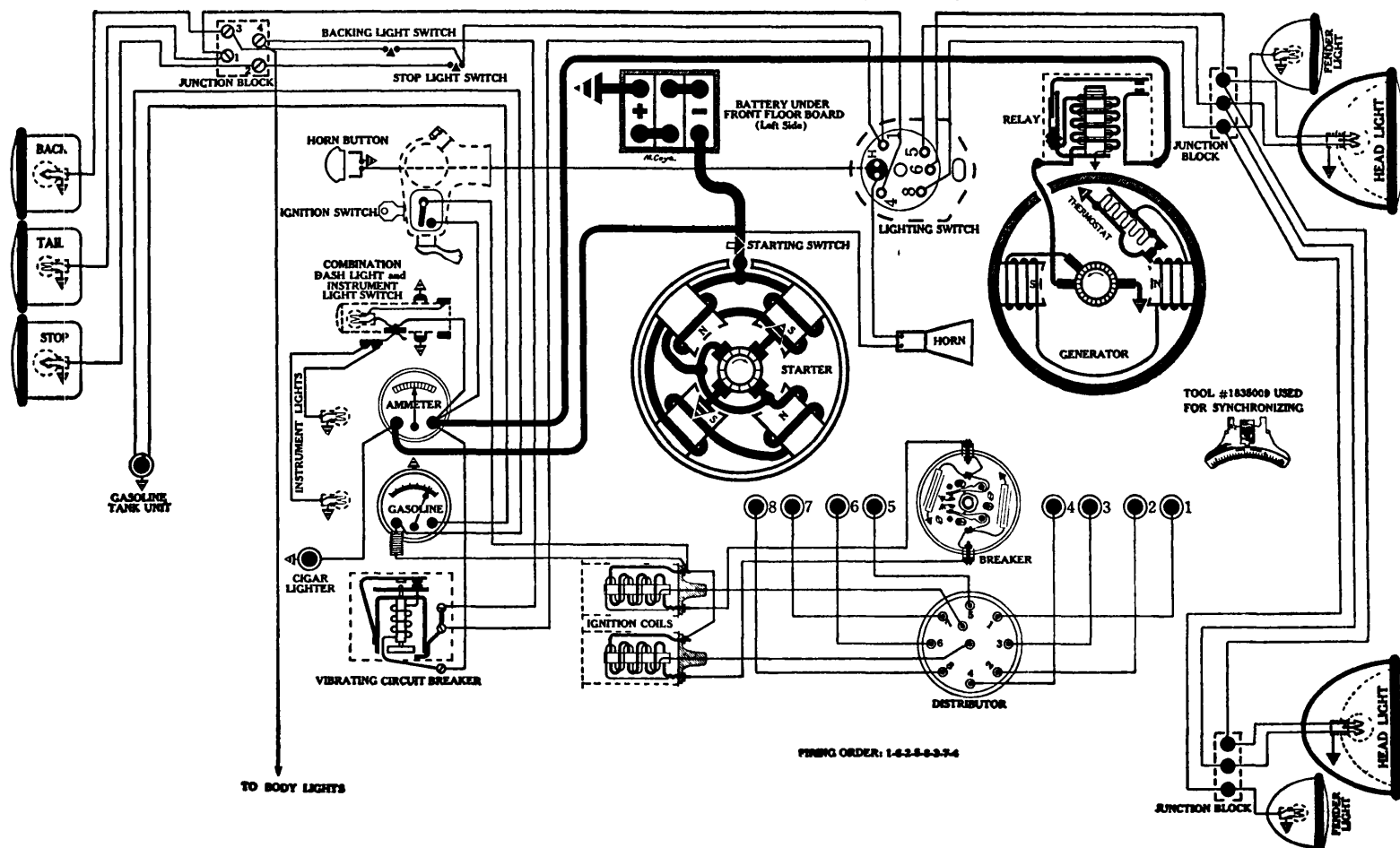
Switch—Delco-Remy, 486-D.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25-30 amps. Operates 10-15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—81; DASH—63; DOME—87; TONNEAU—81; BACK—1129; STOP—1129; TAIL—81.

Models, 134, 139, 144, Straight Eights, (1930)



Willard, WJ-4-15, 6 volts. Positive Terminal Grounded
Starting Capacity—145 amps. for 20 minutes.
Lighting Capacity—5 amps. for 26 hours.
Box—Length, 11 11/16; width, 7 1/16; height, 9 1/4 inches.

Connection to Engine—Mechanical gear shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on starter. This is a gear reduction job, a pinion being cut on the armature shaft.

Running Free—70 amps. at 5 volts, 2500 R.P.M.
Cranking Engine—150-160 amps. at 4.4 volts.
Lock Torque—28 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy 16210.

Breakers—Contact separation .022 inch.
Timing—With No. 1 Piston on T.D.C., power stroke, spark fully retarded, rotor opposite No 1 Dist Cap Terminal, stationary set of breaker points should just open
Contact Spring Tension—18 to 20 oz. on each.
Spark Plugs— $\frac{7}{8}$ inch Regular (Champion No. 4) ; Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—35 degrees (on Flywheel).

Automatic Advance—19 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist R.P.M.	Degrees Advance (on cam)
600	0.2	300	0.1
1000	4	500	2
1500	8	750	4
2500	14	1250	7
3200	19	1600	9.5

Coils—Delco-R my, 528-E.

Ignition Switch—Hershey-Oakes Steering Ignition Lock — Combination Ignition Switch and Steering Post Lock.

Rotation, L. H., Com. End
Delco-Remy, 927-F (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Thermostat open.			Thermostat closed.		
Amps	R P M.	Volts	Amps	R P M	Volts
0	575	65	15	1200	81
3	700	7	20	1450 (Max)	83
6	800	71	19	1700	83
11	1000	79			

NOTE Thermostat opens about 165° F, reducing charging rate approx 30-40%

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test— $4\frac{3}{4}$ to $5\frac{1}{2}$ amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

Delco-Remy, 265-G

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-D.

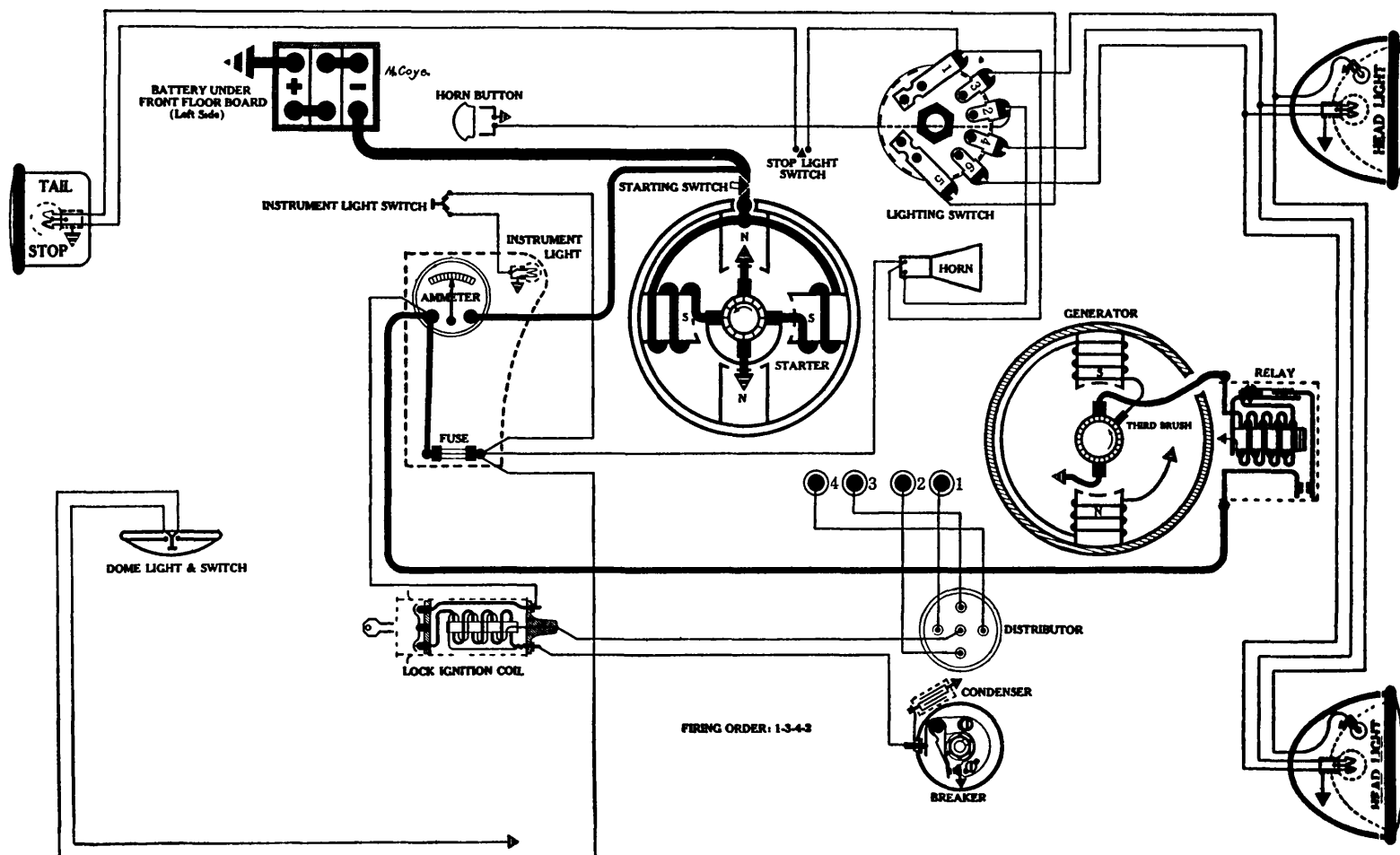
Location—Foot of steering column. Lights controlled by
lev r on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25 to 30 amps. Op rates 10 to 15 amps.

Lamps—See P. 3, Sec. A.A. HEAD—1110 (Bifocal); FENDER—81; DASH—63; DOME—87; TONNEAU—81; BACK—1129; STOP—1129; TAIL—81.

PLYMOUTH

Model, 4 Cyl., (1930)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded
Starting Capacity—98 amps for 20 minutes
Lighting Capacity—5 amps for 17 hours
Box—Length, 9 1/16, width, 7 1/16, height, 8 7/8 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-Q

Connection to Engine—Mechanical gear shift incorporating overrunning disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement closes switch on motor.

Running Free—65 amps at 5 volts, 5000 R P M
Cranking Engine—160 to 180 amps. at 4.2 volts
Lock Torque—12 pound-feet, 475 amps at 3.6 volts
Brush Spring Tension—24 to 28 oz. on each
Starting Switch—Delco-Remy, 820052

IGNITION

Rotation, R. H., Top View
Delco-Remy, 635-W

Breaker—Contact separation .020 inch

Contact Spring Tension—18 to 20 oz

Timing—Hand crank engine until No. 4 Piston is coming up on exhaust stroke. Stop when .050 inch before T D C. With spark fully advanced No. 1 cyl. should just fire.

Spark Plugs—Metric (AC Type G-12); Gap .027 to .030 inch.

Firing Order—1-3-4-2.

Manual Advance—22 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel)

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
600	0-2	300	0-1
800	4	400	2
1200	8	600	4
1800	14	900	7
2400	20	1200	10

Lock Ignition Coil—Delco-Remy, 526 S.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, L. H., Com. End (Belt Drive)
Delco-Remy, 947-B

Performance Data—Gen. cold. No thermostat.

Amps	R P M	Volts	Amps	R P M	Volts
0	725	6.5	14	1600	7.9
3	900	7	16	1800 (Max.)	8
8	1175	7.3	15	2200	8
12	1400	7.7			

Motoring Freely—4 1/2-5 1/2 amps. at 6 volts

Max. Stall Current—15-18 amps at 6 volts.

Field Test—4 to 4 1/2 amps. at 6 volts, across field coils in series

Brush Spring Tension—24 to 28 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts

Opens—0 to 2 1/2 amps discharge

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed

LIGHTING

Switch—Soreng-Manegold No. 5500-A

Location—Foot of steering column. Lights controlled by lever on steering wheel.

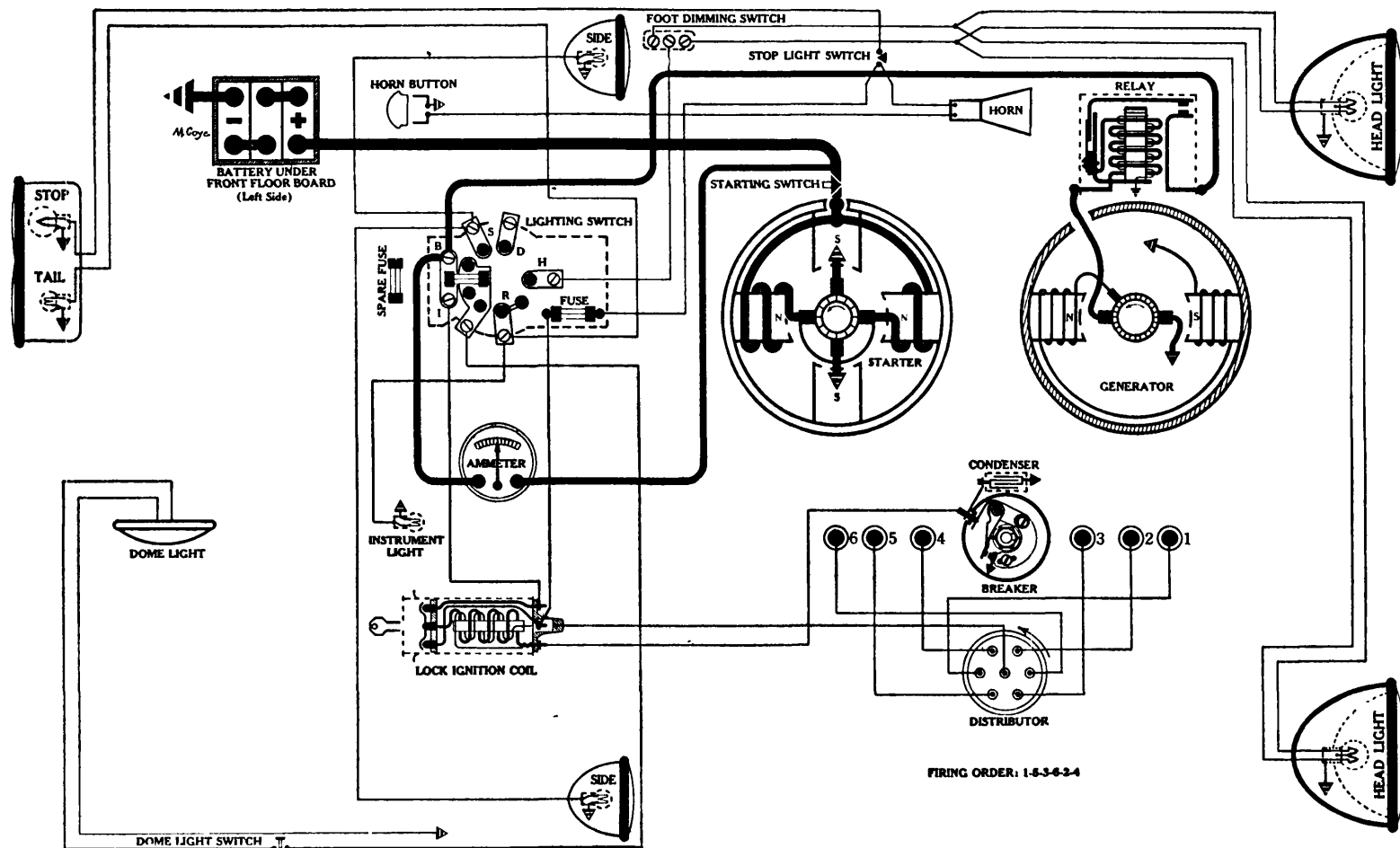
Fuses—Single 20 amp. fuse mounted below ammeter behind instrument board.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX—63, DOME—63, STOP and TAIL—1156; INSTRUMENT—63

NOTE: This is the old style Ford headlight bulb with two filaments. Make sure the 3 C P filament burns for tail light.

PONTIAC

Mod 1, 6-30, 6 cyl., (1930)



BATTERY

Delco-Remy, 13-DW, 6 volts. Negative Terminal Grounded
Starting Capacity—102 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17 hours.
Box—Length, 9 1/16; width, 7; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-R

Connection to Engine—Delco-Remy Mechanical Shift.
Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—175-180 amps. at 4.5 volts.
Lock Torque—12 pound-feet, 475 amps., 3.6 volts.
Brush Spring Tension—24-28 oz. on each.
Starting Switch—Delco-Remy, 820052.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 639-U
(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz.
Timing—With No. 1 Piston on T.D.C., power stroke, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (AC Type G-14); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—(None).

Automatic Advance—24 1/2 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600.....	0-2.....	300.....	0-1.....
1000.....	8.....	500.....	4.....
1500.....	14.....	750.....	7.....
2000.....	18.....	1000.....	9.....
2500.....	24 1/2.....	1300.....	12 1/4.....

Lock Ignition Coil—Delco-Remy, 526-R.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.", "Gauge", and "Timer". Coil must be connected as marked. Feed for horn and stop light taken from "Gauge" terminal of coil.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 943-J (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0.....	575.....	6.5.....	14.....	1400.....	7.9.....
5.....	800.....	7.1.....	16.....	1600.....	8.....
9.....	1000.....	7.5.....	18.....	1700 (Max.).....	8.2.....
12.....	1200.....	7.8.....			

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—17 to 19 amps. at 6 volts.

Field Test—4 1/2 to 5 amps. at 6 volts, across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 266-P

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum No. 9067.

Location—Behind instrument board. Operated by pull knob.

Fuses—(Lighting) 20 amp. fuse mounted on switch back.
(Stop & Horn) 20 amp. fuse mounted on switch support.

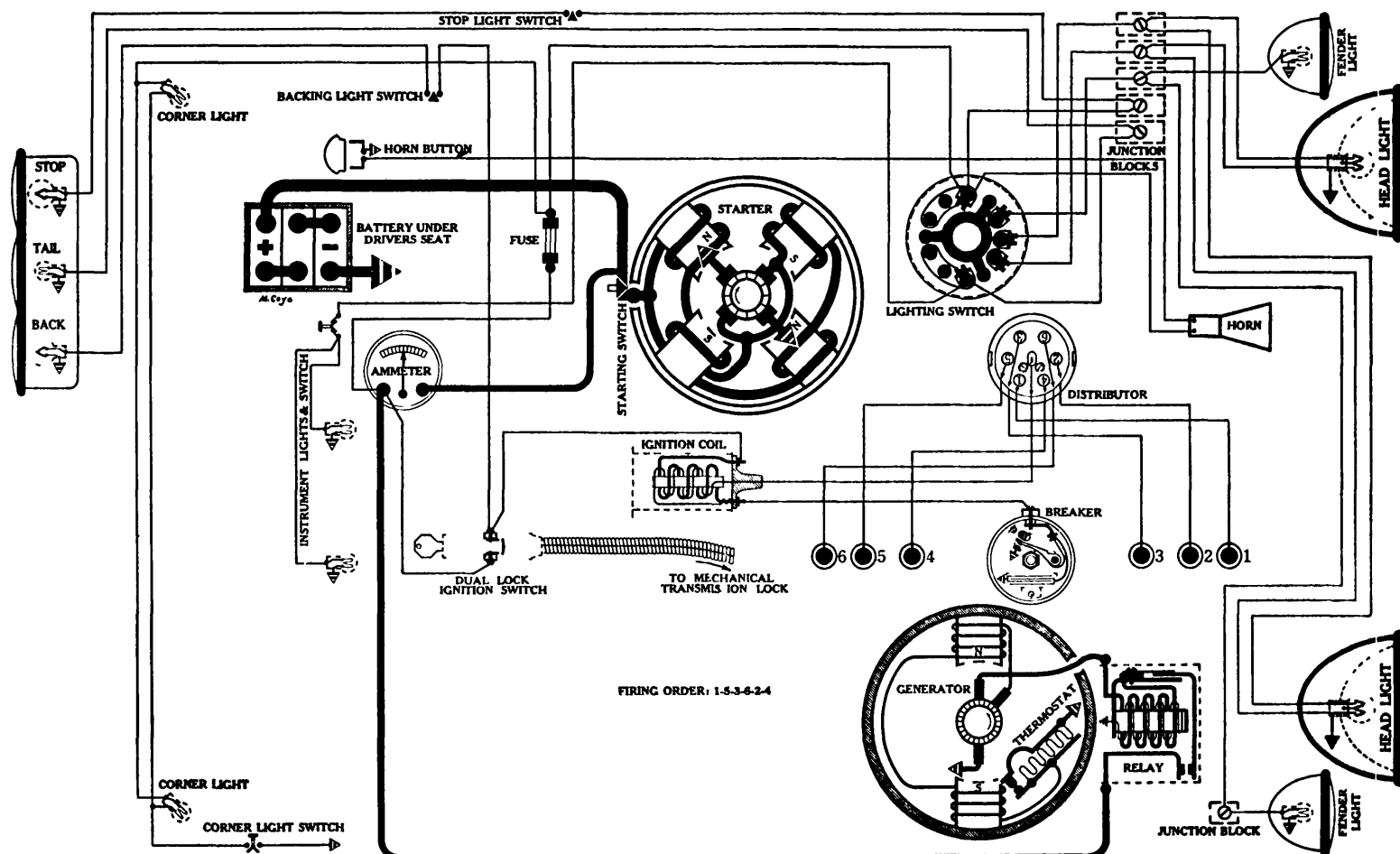
Foot Dimming Switch—Delco-Remy, 465-J.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; STOP—87; TAIL—63.

REO

Model, 25, 6 Cyl., (1930)



BATTERY

Willard, SJRR-4, 6 volts. Negative Terminal Grounded
 Starting Capacity—125 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 22 hours.
 Box—Length, 10 5/16; width, 7 1/16, height, 9 3/4 inches.

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 724-V

Connection to Engine—Mechanical gear shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor. Gear reduction job.

Running Free—70 amps. at 5 volts, 3500 R.P.M.

Cranking Engine—150 to 170 amps. at 4.6 volts.

Lock Torque—22 pound-feet, 600 amps., 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 640-S

Breaker—Contact separation .022 inch

Contact Spring Tension—18 to 20 oz

Timing—Place chalk mark on flywheel 1 1/4 inches ahead of flywheel mark "UDC No 1". With No 1 Piston on compression stroke bring chalk mark opposite pointer. With spark fully retarded, rotor opposite No 1 Dist Cap Terminal, breaker points should just open.

Spark Plugs—Metric (Champion No. 11), Gap .025 inch

Firing Order—1-5-3-6-2-4

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
900	0-2	450	0-1
1500	8	750	4
2200	16	1100	8
3000	22	1500	11

Coil—Delco-Remy, 528-E.

Ignition Switch—Delco-Remy, 425-R, "Dual Lock" (combination ignition switch and mechanical transmission lock).

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 955-G

Performance Data—Gen cold			Thermostat closed		
Amps	RPM	Volts	Amps	RPM	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE: Thermostat opens about 165° F, reducing charging rate approx 30-40%.

Motoring Freely—5 to 5 1/2 amps at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 482-F.

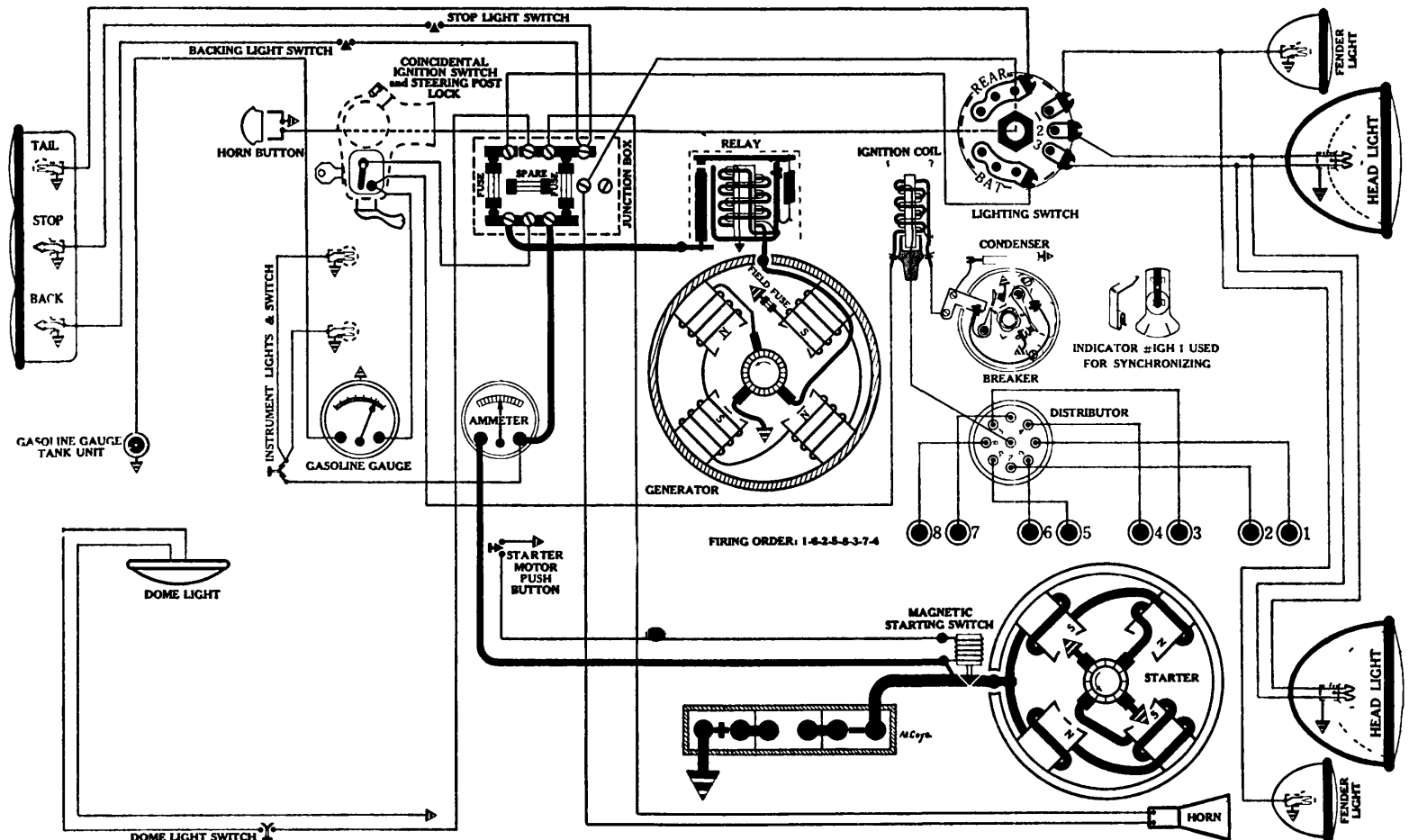
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse mounted on block, driver's side dash.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal), FENDER—63, INSTRUMENT—63; CORNER—64, TAIL—63; STOP—87; BACK—87.

RUXTON

Model, C, Front Wheel Drive, Straight Eight, (1930)



BATTERY

Willard, GRR-5-CBD, 6 volts. Positive Terminal Grounded
Starting Capacity—166 amps. for 20 minutes.
Lighting Capacity—5 amps. for 31 hours.
Box—Length, 20½; width, 5 9/16; height, 8¼ inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MUA-4007

Connection to Engine—Bendix drive.

NOTE Gear reduction job A pinion cut on armature shaft drives a pinion on Bendix shaft

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—185-195 amps. at 4.3 volts.

Lock Torque—27 pound-feet, 575 amps., 3 volts.

Brush Spring Tension—20 to 24 oz. on each.

Starting Switch—Magnetic Type, operated by push button on instrument board.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGH-4005-A

Breakers—Contact separation .020 inch.

Contact Spring Tension—17 to 19 oz. on each.

Timing—With No. 1 Piston on T.D.C power stroke, spark fully advanced, rotor opposite No. 1 Dist Cap Terminal, stationary set of breaker points should just open

Spark Plugs—Metric (Champion No. 10); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
800	0	400	0
1600	6	800	3
2400	11	1200	5.5
3200	17	1600	8.5
3600	20	1800	10

Coil—Auto-Lite, CE-4001.

Ignition Switch—Hershey-Oakes Steering Ignition Lock — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAG-4121

Performance Data—Gen. cold.

Amps	RPM	Volts	Amps.	RPM	Volts
0	525	6.5	10	780	7.3
2	550	6.6	14	1200	7.7
5	650	7	17	1250 (Max)	8

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—17 to 19 amps. at 6 volts.

Field Test—4.3 amps. at 6 volts across field coils in series.

Field Fuse—5 amps.

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. S Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4012

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold No. 2560-A

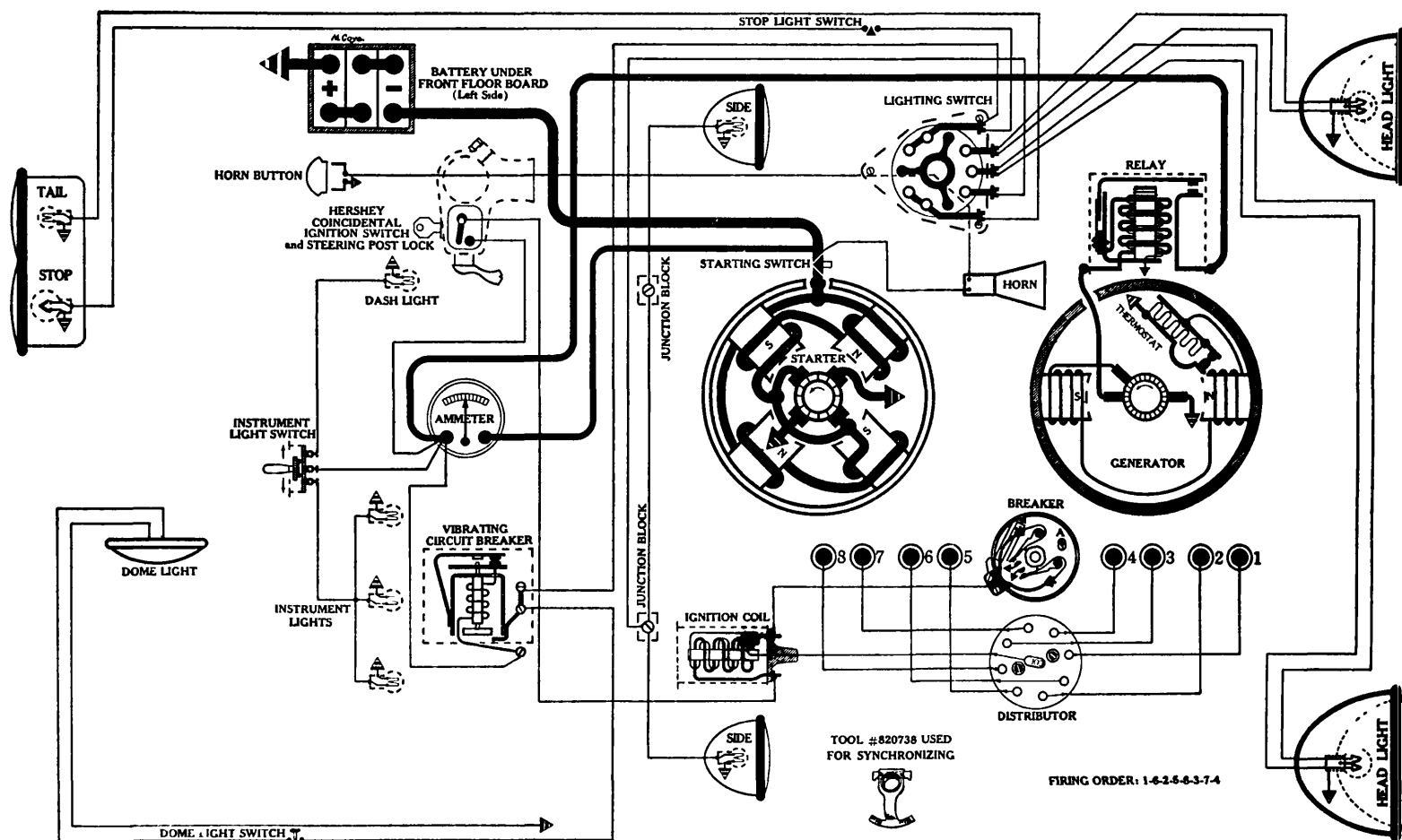
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two 15 amp. fuses in box under hood (left side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—63; STOP—1129; BACK—1129; TAIL—63.

STUDEBAKER

Models, Commander and Dictator Straight Eights, (1930)



BATTERY

Willard, WJ-1-11, 6 volts. Positive Terminal Grounded
Starting Capacity—104 amps. for 20 minutes.
Lighting Capacity—5 amps. for 18 hours
Box—Length, 9 1/16; width, 7 1/16, height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 726-G

Connection to Engine—Mechanical gear shift, incorporating an overrunning clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter.

Running Fre —65 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—185 to 190 amps. at 4.1 volts.

Lock Torque—15 pound-feet, 570 amps., 3.1 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 658-Z

Breakers—Contact separation .022 inch.

Contact Spring Tension—18 to 20 oz. on each

Timing—With No. 1 Piston on T.D.C., power stroke, "UP DC 1-8" mark on flywheel rim opposite pointer, spark lever two-thirds advanced. Rotor opposite No. 1 Dist Cap Terminal, stationary breaker points should just open.

Spark Plugs—7/8" long (AC type Z), Gap .025 inch

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
600	0-2	300	0 1
1000	6	500	3
1800	14	900	7
2800	22	1400	11

Coil—Delco-Remy, 528-E.

Ignition Switch—Hershey-Oakes Steering Ignition Lock — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End (Belt Drive)

Delco-Remy, 955-C, with Thermostat (Commander)

Delco-Remy, 955-S, No Thermostat (Dictator)

Performance Data—Gen. cold. Thermostat closed.

Amps	R.P.M	Volts	Amps.	R.P.M	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Field Test—4.75-5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-E.

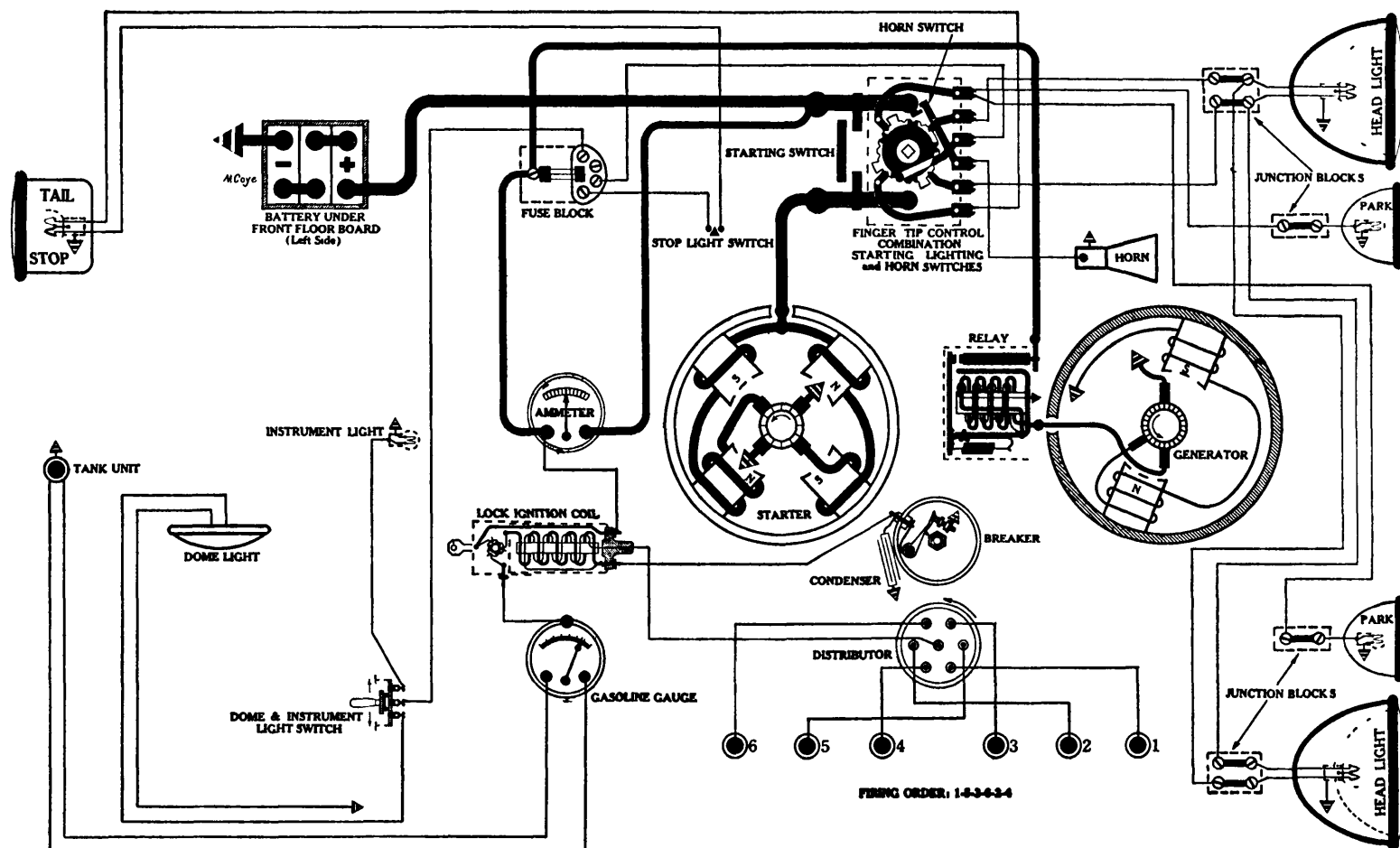
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-F. Starts 25-30 amps. Operates 10-15.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; TAIL—63; INSTRUMENT—63; STOP—81; DOME—81; CORNER—81; DASH—63.

WILLYS

Model, 98-B, 6 cyl., (1930)

**BATTERY**

U. S. L., 3-CVX-6X-7A, 6 volts. Negative Terminal Grounded

Starting Capacity—115 amps. for 20 minutes.

Lighting Capacity—5 amps for 21 hours.

Box—Length, 10 7/16; width, 7 7/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAJ-4002

Connection to Engine—Bendix drive.

Running Free—60 amps. at 5.5 volts.

Cranking Engine—180 amps. at 5.2 volts, 200 R.P.M.

Lock Torque—12 1/2 pound-feet, 575 amps, 3 volts.

Brush Spring Tension—20 to 24 oz. on each

Starting Switch—Located foot of steering column. Operated by pulling up on horn button.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGB-4032

Breaker—Contact separation .020 inch.

Contact Spring Tension—17 to 19 oz.

Timing—With No. 1 Piston on T.D.C. power stroke, spark fully advanced, rotor opposite No. 1 Dist Cap Terminal, breaker points should just open

Spark Plugs—Metric (Champion No. 11); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—14 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel).

Eng RPM	Degrees Advance (on flywheel)	Dist RPM	Degrees Advance (on cam)
400	0	200	0
800	3	400	15
1200	6	600	3
2000	12	1000	6
2400	16	1200	8
3200	22	1600	11

Lock Ignition Coil—Auto-Lite, IG-4083.

NOTE This unit is a combined ignition switch and coil Impossible to 'jump out' ignition switch with wire, to run engine

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAL-4131 (Belt Drive)

Performance Data—Gen. cold.

Amps	RPM	Volts	Amps	RPM	Volts
0	650	6.5	10	1075	7.3
2	720	6.6	14	1340	7.7
5	850	7	16	1800 (Max)	8

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—16-19 amps. at 6 volts.

Field Test—4.7 amps. at 6 volts across field coils in series.

Field Fuse—(None).

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton No. 50160.

Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.

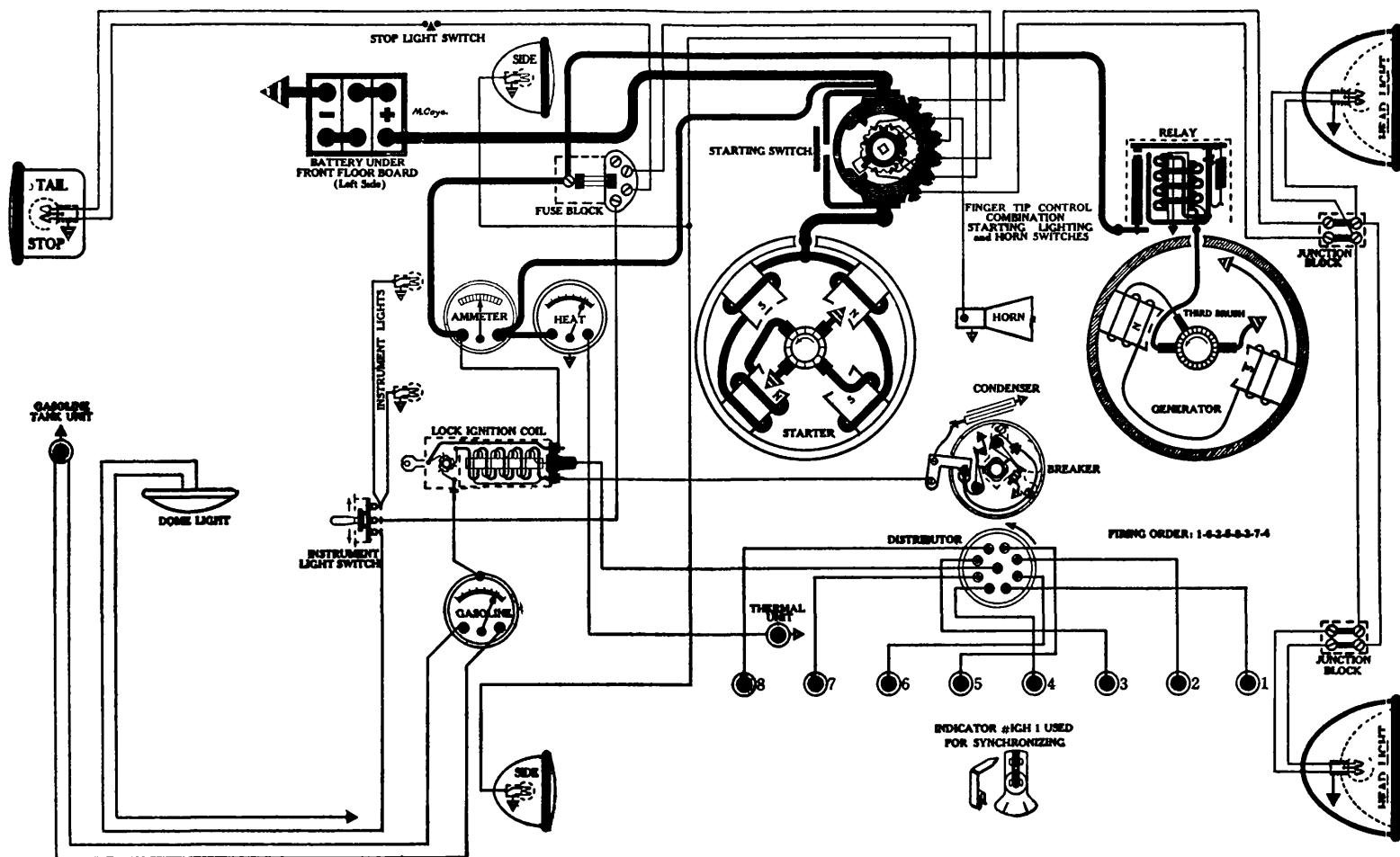
Fuses—Single 20 amp. fuse mounted on block under engine hood (left side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); PARK—63; INSTRUMENT—63; DOME—63; STOP and TAIL—1158.

NOTE This is the old style Ford headlight bulb with two filaments. Make sure the 3 C P filament burns for tail light.

WILLYS

Model, 8-80, Straight Eight, (1930)



BATTERY

U. S. L., 3-HVX-7X-6A, 6 volts. Negative Terminal Grounded

Starting Capacity—148 amps. for 20 minutes.

Lighting Capacity—5 amps. for 28 hours.

Box—Length, 11 3/4; width, 7 7/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4031

Connection to Engine—Bendix drive.

Running Free—60 amps. at 6 volts.

Cranking Engine—160-170 amps. at 5 volts.

Lock Torque—17 pound-feet, 520 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Located foot of steering column. Operated by pulling up on horn button.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGH-4013

Breakers—Contact separation .018 inch.

Contact Spring Tension—17 to 19 oz. on each.

Timing—With No. 1 Piston on compression stroke, bring flywheel mark "IGN" opposite pointer, spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal; stationary set of breaker points should just open.

Spark Plugs—Metric (Champion No. 8); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel).

Eng R.P.M.	Degrees Advanc (on flywheel)	Dist R.P.M.	Degrees Advance (on cam)
400	0	200	0
1200	6	600	3
2000	13	1000	6 1/2
3000	19	1500	9 1/2
3400 (Max)	22	1700	11

Lock Ignition Coil—Auto-Lite, IG-4083.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4131 (Belt Drive)

Performance Data—Gen. cold.

Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	650	6.5	10	1075	7.3
2	720	6.6	14	1340	7.7
5	850	7	16	1800 (Max)	8

Motoring Freely—5 to 5 1/2 amps at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—4.7 amps. at 6 volts across field coils in series.

Field Fuse—(None).

Brush Spring Tension—20 to 24 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Aid Mfg. Co., No. 805.

Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.

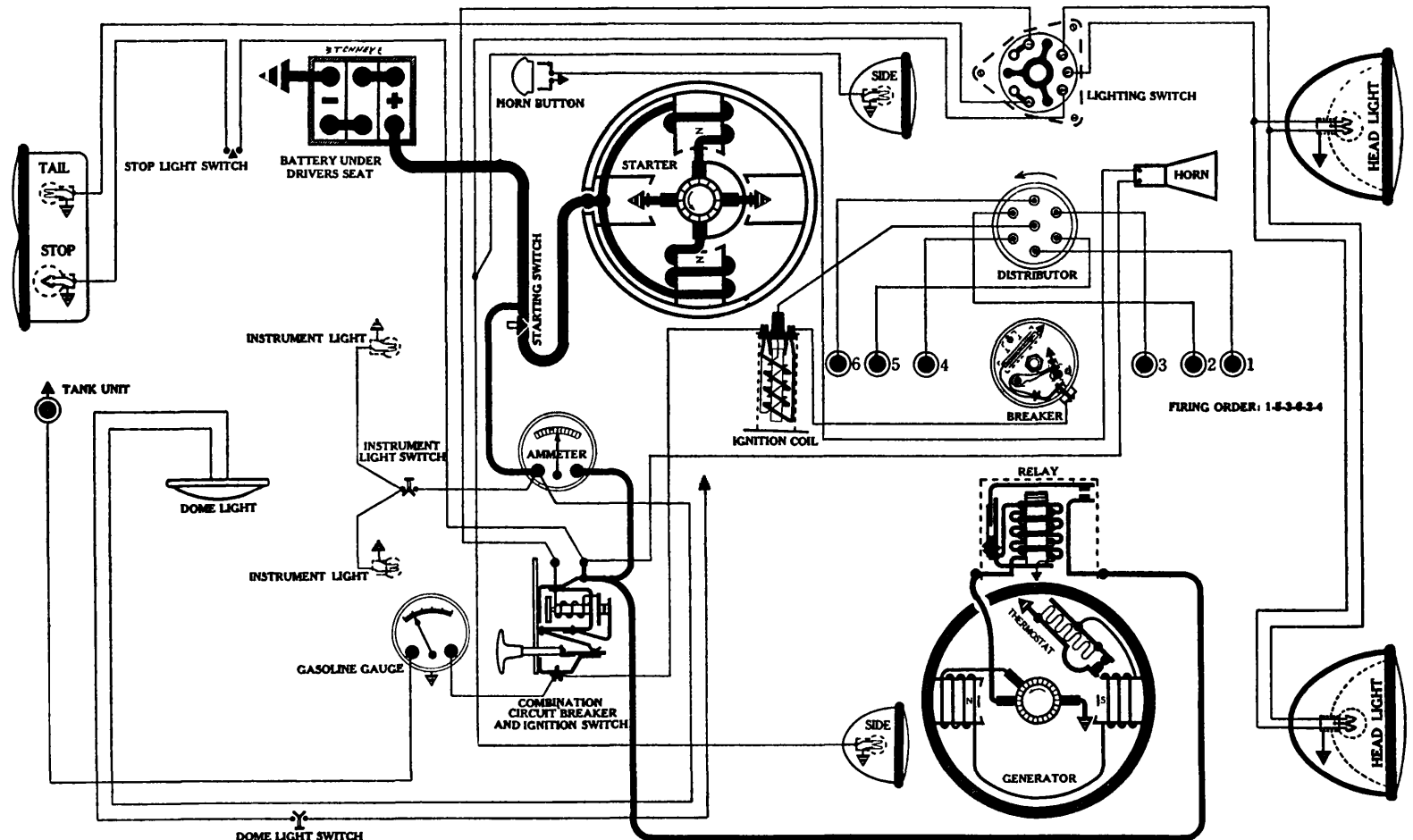
Fuses—Single 20 amp. fuse mounted on block under engine hood (left side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; STOP and TAIL—1158.

NOTE: This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

WINDSOR

Mod ls 6-72 — 6-77, 6 cyl., (1930)



BATTERY

U. S. L., XY-15-X-6, 6 volts. Negative Terminal Grounded
Starting Capacity—119 amps. for 20 minutes.
Lighting Capacity—5 amps. for 21 hours.
Box—Length, 10 7/16; width, 7 1/4; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-G

Connection to Engine—Bendix drive.
Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—175-180 amps. at 4.5 volts.
Lock Torque—12 pound-feet, 475 amps., 3.6 volts.
Brush Spring Tension—24-28 oz. on each
Starting Switch—Delco-Remy, 406A.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 640-F

Breaker—Contact separation .018 to .024 inch.
Contact Spring Tension—17-21 oz.
Timing—With No. 6 Piston on T.D.C., power stroke, "Ign" mark on flywheel rim opposite pointer, spark fully retarded, rotor opposite No. 6 Dist. Cap Terminal, breaker points should just open
Spark Plugs—Metric (Champion No. 8); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Manual Advance—20 degrees (on Flywheel).
Automatic Advance—30 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
500	0-1	250	0-5
800	4-6	400	2-3
1200	10-12	600	5-6
1800	16-18	900	8-9
2400	22-24	1200	11-12
3200	28-30	1600	14-15

Coil—Delco-Remy, 528-C.
Ignition Switch—Delco-Remy, 1325.

Location—On instrument board.

NOTE: This unit combines a vibrating circuit breaker with switch. Ignition circuit not thru vibrator.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 949-V

Performance Data—Gen. cold. Thermostat closed.

Amps	RPM	Volts	Amps	RPM	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE: Thermostat opens about 165° F, reducing charging rate approx 30-40%

Motoring Freely—5-5 1/2 amps. at 6 volts.

Max. Stall Current—18-20 amps. at 6 volts.

Field Test—4.75-5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14-18 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 1309.

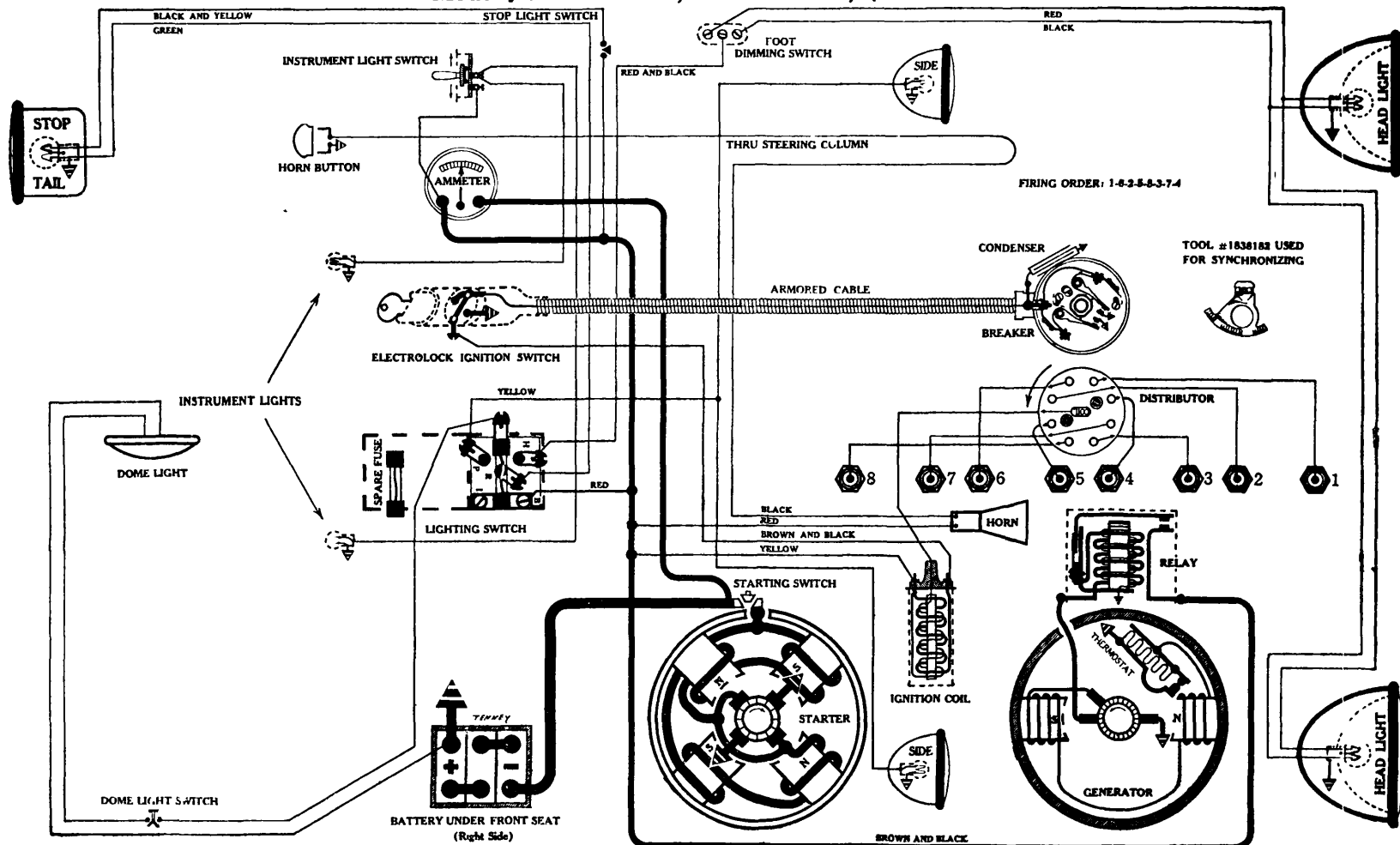
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Starts 25-30 amps. Operates 10-15 amps.

Lamps—See P. 3, Sec. AA. **HEAD**—1110 (Bifocal); **SIDE**—63; **INSTRUMENT**—63; **TAIL**—63; **DOME**—63; **STOP**—87.

AUBURN

Models, Standard 8-98, Custom 8-98A, (1931)

**BATTERY**

U.S.L., XY-15X-7A, 6 volts. Positive Terminal Grounded.
 Starting Capacity—119 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 21 hours.
 Box—Length, 10 7/16; width, 7 1/4; height, 9 1/4 inches.

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 722-F

Connection to Engine—Bendix Drive.

NOTE:—This is a gear reduction starter

Running Free—70 amps at 5 volts, 3500 R.P.M.

Cranking Engine—160-180 amps. at 4 1/2 volts.

Lock Torque—22 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy 821627 mounted on starter. Operated by pull cable.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, L. H., Top View
 Delco-Remy, 660-Z

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing with Motor Gauge—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .061 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal stationary set of breaker points should just open.

Spark Plugs—3/8 inch (Champion No. C-4); Gap .020 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—26 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
500	0	250	0
800	4	400	2
1200	9	600	4 1/2
1600	14	800	7
2000	19	1000	9 1/2
2400	24	1200	12
2600 (Max.)	26	1300	13

Ignition Coil—Delco-Remy, 528-C.

Ignition Switch—"Electrolock" (single terminal, type 14A).

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy 955-H

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

Note:—Thermostat opens about 165° F., reducing charging rate approx. 30-40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 1/4 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Armature—Delco-Remy, 819976.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5670-A.

Location—Behind instrument board. Operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back.

Spare fuse in clip on switch support.

Foot Dimming Switch—Delco-Remy, 465-K.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

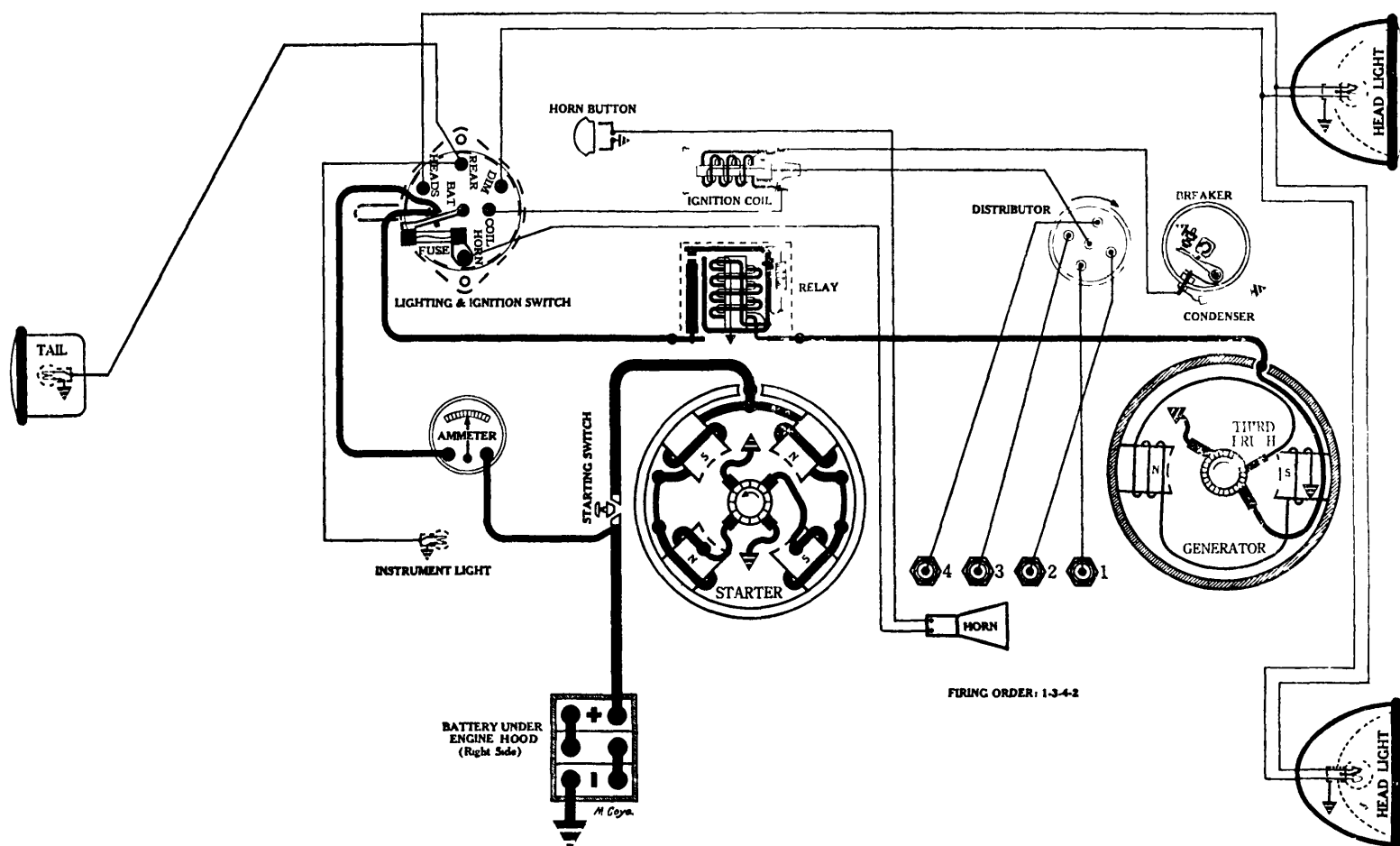
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—81;

INSTRUMENT—63; DOME—81; COWL—63; STOP AND TAIL—1158.

NOTE:—This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

AUSTIN

Model 1931



BATTERY

U. S. L., 3-CYX-4X7A, 6 volts. Negative Terminal Grounded.
Starting Capacity—68 amps for 20 minutes.
Lighting Capacity—5 amps. for 11 hours.
Box—Length, 7 3/16; width, 7; height, 8 5/8 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAK-4001

Connection to Engine—Special Bendix Drive, type RCE-11-10T. For details of operation, and instructions on assembling refer to Section AA.

Running Freq.—35 amps. at 5 1/2 volts.
Cranking Engine—130 amps. at 4 3/4 volts.
Lock Torque—7 pound-feet, 520 amps., 4 volts.
Brush Spring Tension—30 to 36 oz. on each.
Starting Switch—Auto-Lite, SW-4204.
Armature—Auto-Lite, MAK-2006.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGB-4034-A
(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
Contact Spring Tension—17 to 19 oz.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 8. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .020 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—Metric (Champion No. 10); Gap .030 inch.
Firing Order—1-3-4-2.
Manual Advance—None.

Automatic Advance—22 degrees (on Flywheel).		Automatic Advance—22 degrees (on Flywheel).	
Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0	300	0
1000	4	500	2
1400	8	700	4
1800	12	900	6
2200	16	1100	8
2600	20	1300	10
2800 (Max.)	22	1400	11

Coil—Auto-Lite, IG-4065.

GENERATOR

Rotation, R. H., Com. End
Auto-Lite, GAS-4101

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0	825	6.4
3	1000	6.8
6	1200	7.
9	1400	7.4
12	1800	7.7
14	2400 (Max.)	8.
14	2800	8.

Motoring Freely—6 1/2 amps. at 6 volts (with Distributor); 4 1/2 amps. at 6 volts (without Distributor).

Max. Stall Current—29 amps. at 6 volts.

Field Test—3.8 amps. at 6 volts, across field coils in series.

Field Fuse—(None).

Brush Spring Tension—15 to 20 oz. on each.

Armature—Auto-Lite, GAS-3006.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.

Opens—1/2 to 1 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton No. 50518, Combination Lighting and Ignition.

Location—On instrument board.

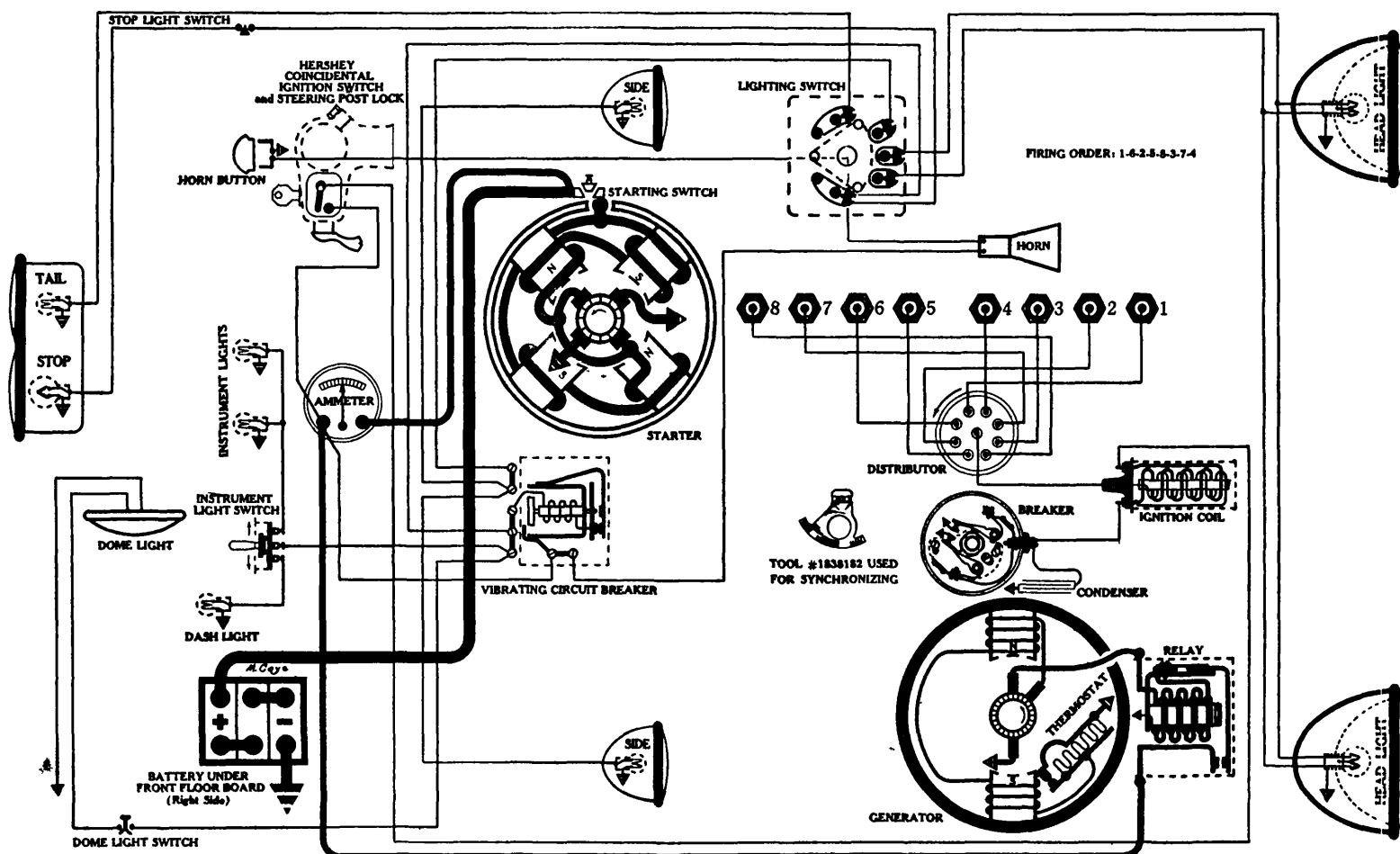
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch back.

Lamps—See P. 3, Sec. AA. HEAD—1158; INSTRUMENT—63;

TAIL—63.

BUICK

M d l 8-50, Straight Eight, (1931)



BATTERY

Delco-Remy, 13-D, 6 volts. Negative Terminal Grounded.

Starting Capacity—102 amps. for 20 minutes.

Lighting Capacity—5 amps. for 17 hours.

Box—Length, 9 1/16; width, 7; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 725-N

Connection to Engine—Mechanical Gear Shift incorporating over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—165 to 185 amps. at 4.2 volts

Lock Torque—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, L. H., Top View

Delco-Remy, 660-L

Breakers—Contact separation .020 inch

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke, flywheel mark "Adv" (which is 12 degrees before T.D.C.) opposite index line, spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal; stationary breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 31. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .055 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (AC type J-12); Gap .025 to .030 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—24 degrees (on Flywheel)

Automatic Advance—21 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
450	0	225	0
600	6	300	3
1000	10	500	5
1200	14	600	7
1600 (Max)	21	800	10 1/2

Coil—Delco-Remy, 528-H.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 940-T-3

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts
0	450	6.5
5	700	7.1
10	850	7.5
12	1000	7.8
15	1200	7.9
18-20	1450 (Max)	8.

NOTE—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%

Motoring Freely—6 amps. at 6 volts.

Max. Stall Current—20 amps. at 6 volts.

Field Test—4 1/4 to 5 1/2 amps. at 6 volts, across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1837906

Third Brush Adjustment—Loosen cover band See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch

Core Gap—.014 to .018 inch, contacts closed

LIGHTING

Switch—Delco-Remy, 486-L.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-G Starts 25 to 30 amps. discharge. Operates 10 to 15 amps.

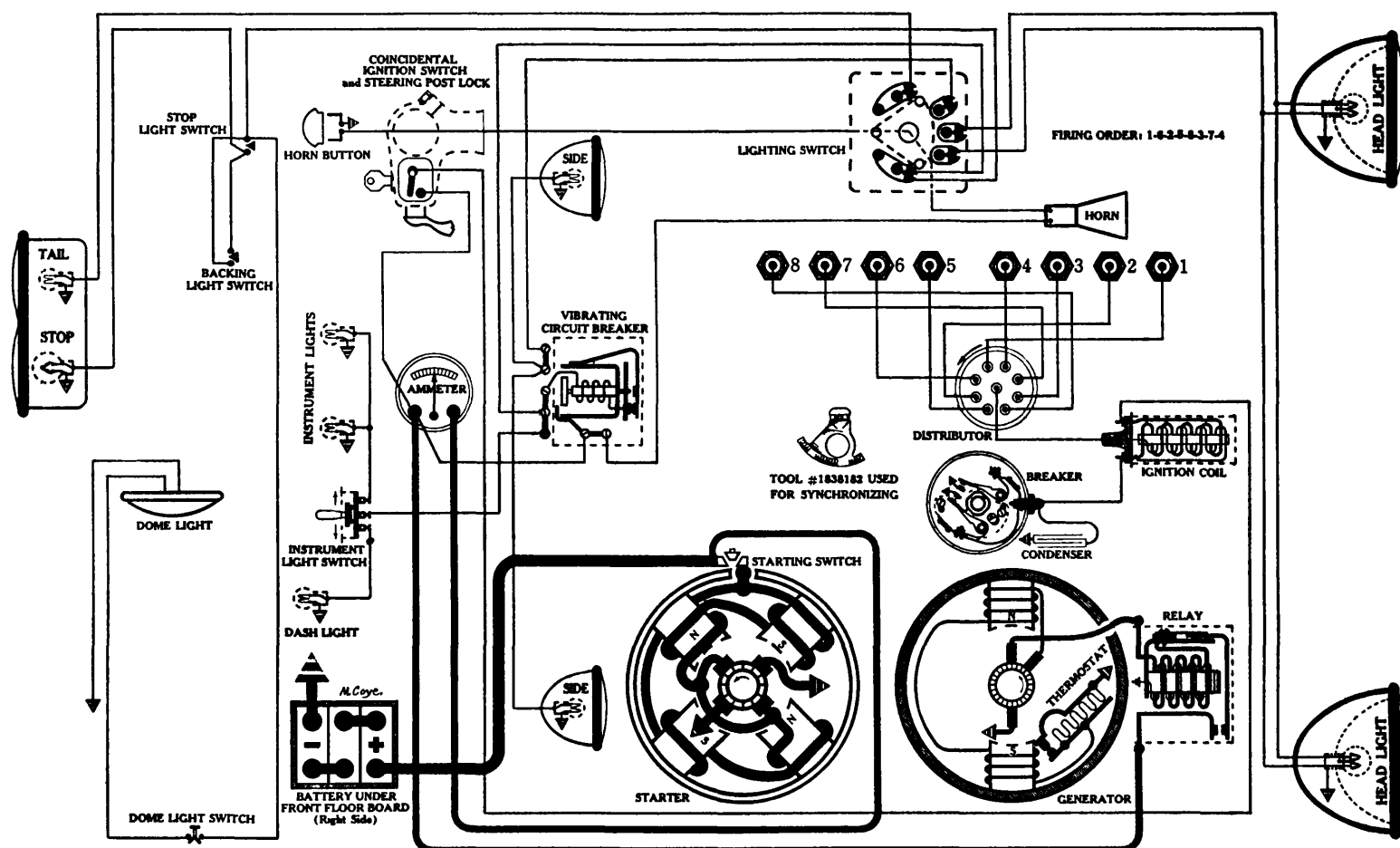
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—62;

TAIL—63; STOP—87; INSTRUMENT—63; DOME—81; TON-

NEAU—63.

BUICK

Mod ls, 8-60, 8-80, 8-90, Straight Eights, (1931)



BATTERIES

MODEL 8-60:—

Delco-Remy, 13-E, 6 volts. Negative Terminal Grounded.

Starting Capacity—117 amps. for 20 minutes.

Lighting Capacity—5 amps. for 19 hours

Box—Length, 9 1/16; width, 7; height, 8 3/4 inches

MODELS 8-80 and 8-90:—

Delco-Remy, 15-C, 6 volts. Negative Terminal Grounded.

Starting Capacity—137 amps. for 20 minutes.

Lighting Capacity—5 amps. for 23 1/2 hours.

Box—Length, 10 9/32; width, 7; height, 9 5/8 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 725-L

Connection to Engine—Mechanical Gear Shift incorporating over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—165 to 185 amps. at 4.2 volts.

Lock Torque—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 820158.

IGNITION

Rotation, L. H., Top View

Delco-Remy, 660-E

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—IMPORTANT! Time ignition in full advance position.

With No. 1 piston on compression stroke, flywheel mark "Adv." (which, on Model 8-60, is 11 degrees, and on Models 8-80 and 8-90, 10 degrees before T.D.C.) opposite index line, spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal; stationary breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 31. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. On Model 8-60 stop when .051 inch, and on Models 8-80 and 8-90, when .042 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (AC, type J-12); Gap .025 to .030 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—24 degrees (on Flywheel).

Automatic Advance—34 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
500	0	250	0
800	4	400	2
1400	9	700	4 1/2
2400	24	1200	12
3200 (Max.)	34	1600	17

Coil—Delco-Remy, 528-H.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 940-T-2

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts
0	450	6.5
5	700	7.1
10	850	7.5
12	1000	7.8
15	1200	7.9
18-20	1450 (Max.)	8.

NOTE.—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—6 amps. at 6 volts.

Max. Stall Current—20 amps. at 6 volts.

Field Test—4 1/4 to 5 1/2 amps. at 6 volts, across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1837906.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-L.

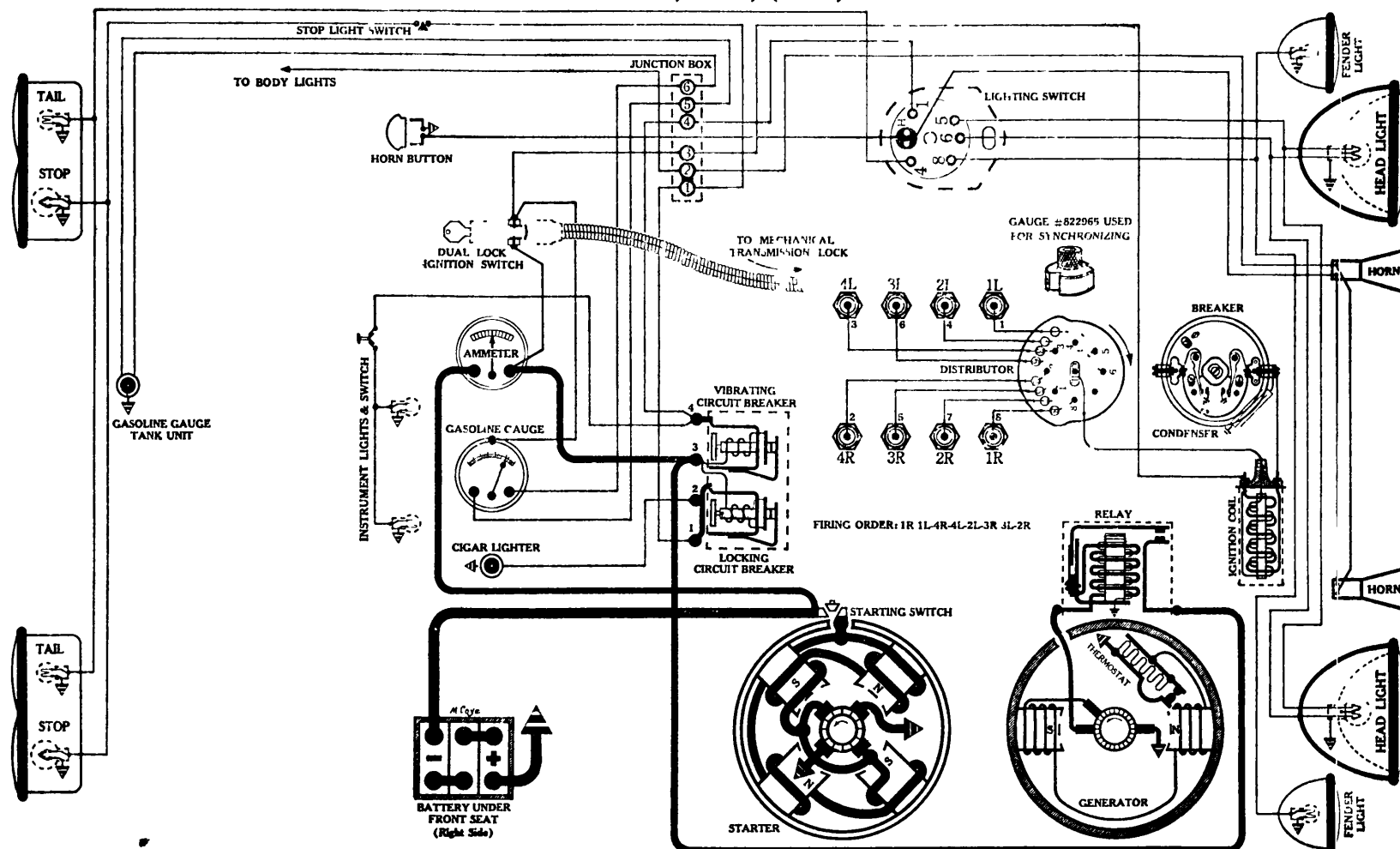
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-G. Starts 25 to 30 amps. discharge. Operates 10 to 15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; TAIL—63; STOP—87; INSTRUMENT—63; DOME—81; TON-NEAU—63.

CADILLAC

Model 355-A, "V8", (1931)



BATTERY

Delco-Remy, 15-C, 6 volts. Positive Terminal Grounded.

Starting Capacity—137 amps. for 20 minutes.

Lighting Capacity—5 amps. for 23½ hours.

Box—Length, 10 9/32; width, 7; height, 9 7/8 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 728-D

Connection to Engine—Mechanical gear shift, incorporating an overrunning clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter. Gear reduction job.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—245 to 260 amps. at 4 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 16210.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 4055

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.

Timing—IMPORTANT! Time ignition in full advance position. With No. 1L piston on compression stroke, flywheel mark "IG-A" (which is 2¼ inches ahead of T.D.C.) opposite indicator, spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal, stationary breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1L piston is coming up on compression stroke. Stop when .025 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Firing Order—1R-1L-4R-4L-2L-3R-3L-2R.

Spark Plugs—Metric (AC type G-10); Gap .025 inch.

Manual Advance—40 degrees (on Flywheel).

Automatic Advance—30 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
1000	0-2	500	0-1
1500	6-8	750	3-4
2500	14-16	1250	7-8
3000	22-24	1500	11-12
3800 (Max.)	28-30	1900	14-15

Coil—Delco-Remy, 530-J.

Ignition Switch—Delco-Remy, 426-P "Dual Lock." (Combination Ignition Switch and Mechanical Transmission Lock.)

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 927-D

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts
0	575	6.5
3	700	7.
6	800	7.1
11	1000	7.9
15	1200	8.1
20	1450 (Max.)	8.3

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—3½ to 4 amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—2.1 amps. at 6 volts, across field coils in series.

Brush Spring Tension—16 to 20 oz. on each.

Armature—Delco-Remy, 18102.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Delco-Remy, 266-N

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .016 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 426-P.

Location—Foot of Steering Column. Light controlled by lever on steering wheel.

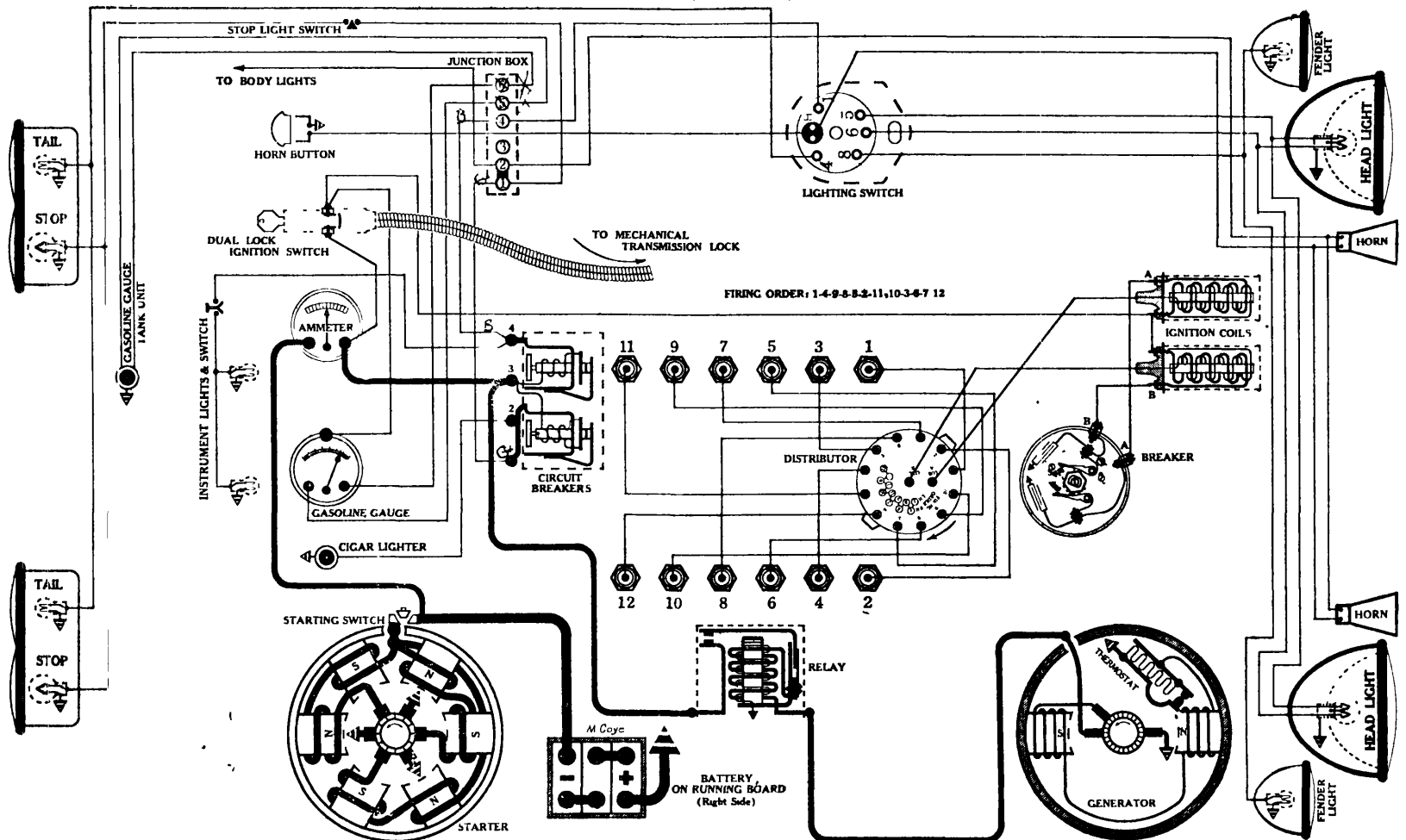
Circuit Breaker—Delco-Remy, 5759.

Vibrating Reels—Starts 25 to 30 amps. Operates 10 to 15. Lock-Out—Starts 25 to 30 amps. Operates with discharge less than 1 ampere.

Lamps—See P. 3; Sec. AA. HEAD—1110 (Bifocal); FENDER—63; STOP—87; TAIL—63; INSTRUMENT—63.

CADILLAC

Model 370-A, "V-12", (1931)



BATTERY

Exide, 3-LXV-15-1R, 6 volts. Positive Terminal Grounded.

Starting Capacity—150 amps. for 20 minutes.

Lighting Capacity—5 amps. for 29 hours.

Box—Length, 14½; width, 7; height, 9 3/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 457

Connection to Engine—Mechanical Gear Shift, incorporating an overrunning clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter.

Running Free—70 amps. at 5½ volts, 2200 R.P.M.

Cranking Engine—265 to 280 amps. at 4 volts.

Lock Torque—35 pound-feet, 600 amps. at 3 volts

Brush Spring Tension—36 to 40 oz. on each.

Starting Switch—Delco-Remy, 16210.

Armature—Delco-Remy, 1837058

IGNITION

Rotation, R. H., Top View
Delco-Remy, 4069

Breakers Contact separation .018 inch.

NOTE—Due to the peculiar design of the ignition cam, to insure good high speed performance the contact separation must be accurately adjusted to .018 inch and no more.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 37½ degrees after stationary. Unequal intervals of 37½-22½-37½, etc. degrees between interruptions.

Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke, flywheel mark "IG-A" (which is 1-27/32 inches ahead of T.D.C.) opposite indicator, spark fully advanced. rotor opposite No. 1 Dist. Cap Terminal, stationary breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 33. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .068 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (AC type G-8); Gap .025 to .028 inch.

Firing Order—1-4-9-8-5-2-11-10-3-6-7-12

Manual Advance—14 degrees (on Flywheel).

Automatic Advance—32 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0	300	0
800	6	400	3
1000	13	500	6½
1200	20	600	10
1600 (Max.)	32	800	16

Coil—Delco-Remy, 530-G or H.

Ignition Switch—Delco-Remy, 426-P "Dual Lock." (Combination Ignition Switch and Mechanical Transmission Lock).

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-K

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	11	1000	7.9
3	700	7.1	15	1200	8.1
6	800	7.1	20	1450 (Max.)	8.3

NOTE—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—3½ to 4 amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—2.1 amps. at 6 volts, across field coils in series.

Brush Spring Tension—16 to 20 oz. on each.

Armature—Delco-Remy, 1839087.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 266-E

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed

LIGHTING

Switch—Delco-Remy, 486-H.

Location—Foot of Steering Column. Lights controlled by lever on steering wheel.

Circuit Breaker—Delco-Remy, 5759.

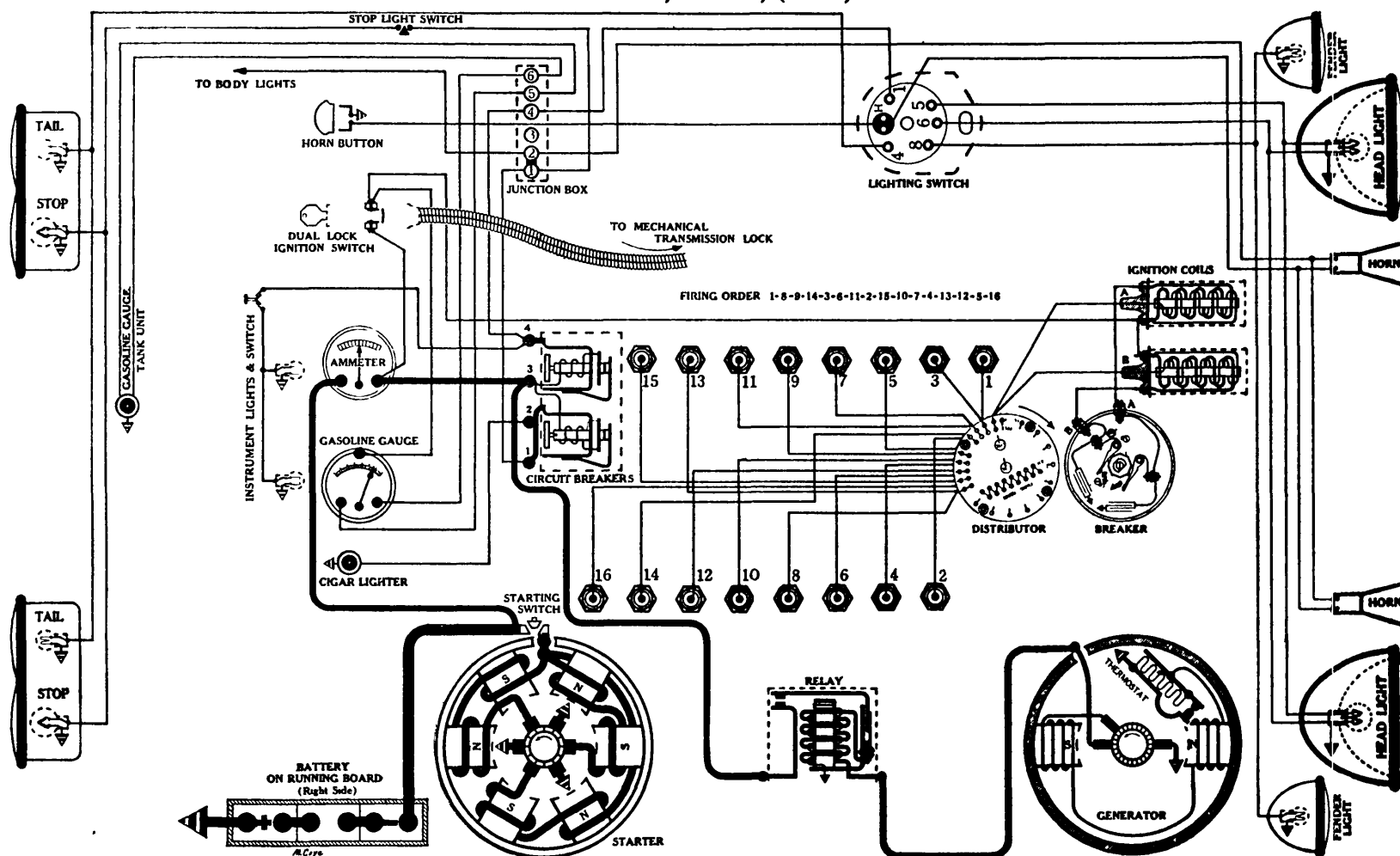
Vibrating—Starts 25 to 30 amps. Operates 10 to 15.

Lock-Out—Starts 25 to 30 amps. Operates with discharge less than 1 ampere.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; STOP—87; TAIL—63; INSTRUMENT—63.

CADILLAC

Mod 1452-A, "V-16", (1931)



BATTERY

Exide, 3-XCRV-21-2G, 6 Volts. Positive Terminal Grounded
Starting Capacity—163 amps for 20 minutes.
Lighting Capacity—5 amps. for 30 hours
Box—Length, 20 7/16; width, 5 1/2; height, 8 11/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 457

Connection to Engine—Mechanical Gear Shift, incorporating an overrunning clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter.

Running Free—70 amps. at 5 1/2 volts, 2200 R. P. M.

Cranking Engine—265 to 280 amps. at 4 volts.

Lock Torque—35 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—36 to 40 oz. on each.

Starting Switch—Delco-Remy, 16210.

Armature—Delco-Remy, 1837058.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 4057

Breakers—Contact separation .015 inch.

NOTE: Due to the peculiar design of the ignition cam, to insure good high speed performance the contact separation must be accurately adjusted to .015 inch and no more.

Contact Spring Tension—18 to 20 oz. on each

Synchronizing—Movable points open 22 1/2 degrees after stationary.

Equal 22 1/2 degree intervals between interruptions.

Timing—IMPORTANT! Time ignition in full advance position.

With No. 1 piston on compression stroke, flywheel mark "IG-A" opposite indicator, spark fully advanced, rotor opposite No. 1 Dist Cap Terminal, stationary breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 33. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .037 inch before T. D. C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist Cap Terminal, stationary set of breaker points should just open.

Firing Order—1-8-9-14-3-6-11-2-15-10-7-4-13-12-5-16

NOTE All odd cylinder numbers on left bank; No. 1 nearest radiator; all even numbers on right bank (see diagram).

Spark Plugs—Metric (AC Type G-10); Gap .025 to .028 inch.

Manual Advance—38 degrees (on Flywheel).

Automatic Advance—32 1/2 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0	300	0
800	3	400	1.5
1000	6	500	3
1600	14	800	7
2000	20	1000	10
2600	29	1300	14.5
2800 (Max.)	32.5	1400	16

Coils—Delco-Remy, 530-H.

Ignition Switch—Delco-Remy, 426-M "Dual Lock" (Combination Ignition Switch and Mechanical Transmission Lock).

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-K

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts
0	575	6.5
3	700	7.
6	800	7.1
11	1000	7.9
15	1200	8.1
20	1450 (Max.)	8.3

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—3 1/2 to 4 amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—2.1 amps. at 6 volts, across field coils in series.

Brush Spring Tension—16 to 20 oz. on each.

Armature—Delco-Remy, 1839087.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 266-E

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-H.

Location—Foot of Steering Column. Lights controlled by lever on steering wheel.

Circuit Breaker—Delco-Remy, 5759.

Vibrating—Starts 25 to 30 amps. Operates 10 to 15.

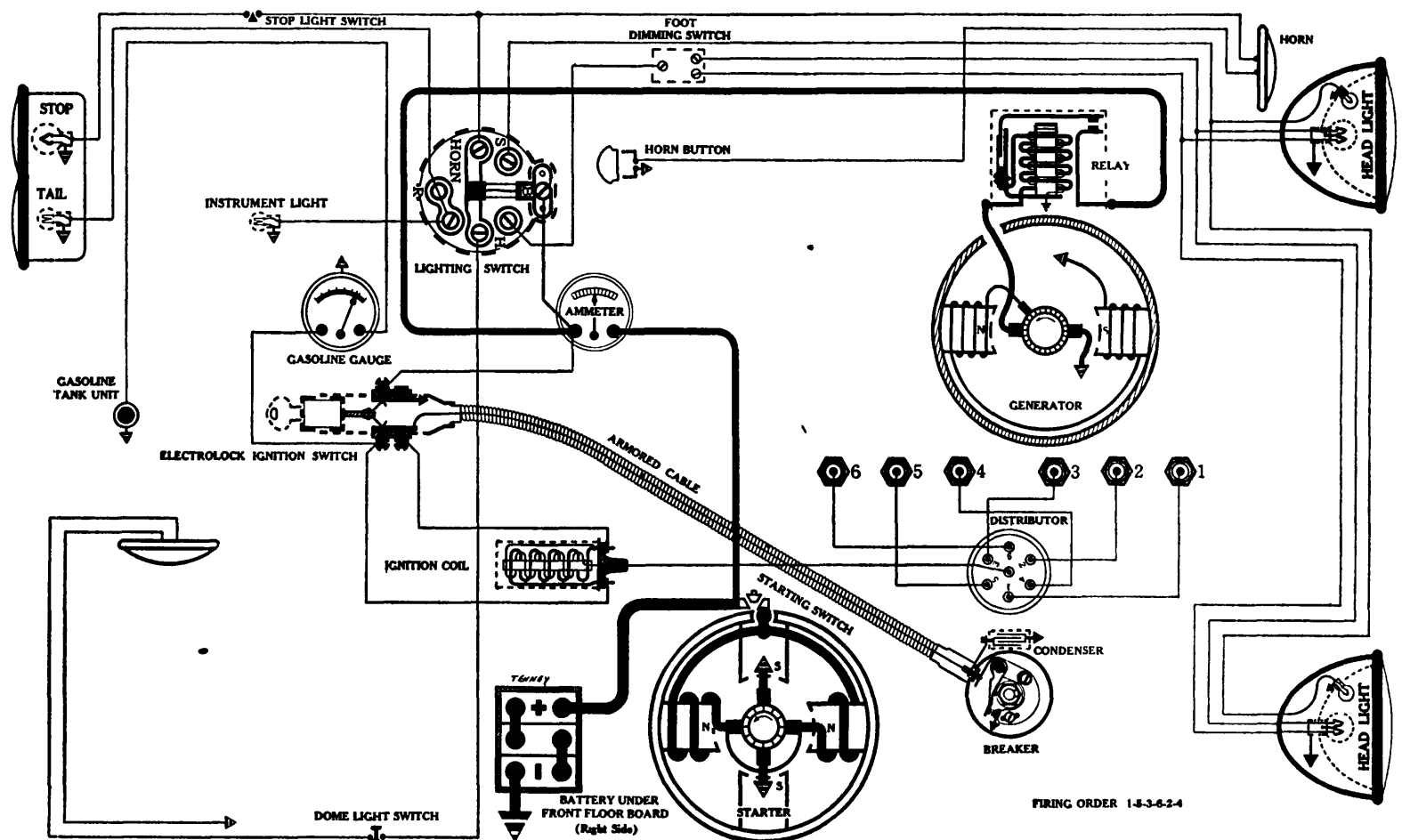
Lock-Out—Starts 25 to 30 amps. Operates with discharge less than 1 ampere.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; STOP—87; TAIL—63; INSTRUMENT—63.

CHEVROLET

Model AD, 6 cyl., (1930)

Model AE, 6 cyl., (1931)



BATTERY

Delco-Remy, 13-B, 6 volts. Negative Terminal Grounded.
 Starting Capacity—102 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 17 hours
 Box—Length, 9 23/32; width, 7 1/16; height, 8 31/32 inches

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 714-L

Connection to Engine—Bendix Drive.
 Running Free—65 amps. at 5 volts, 5000 R.P.M.
 Cranking Engine—165 to 175 amps. at 4.3 volts.
 Lock Torque—12 pound-feet, 475 amps., 3.63 volts.
 Brush Spring Tension—24 to 28 oz. on each.
 Starting Switch—Delco-Remy, 827411 (on starter).
 Armature—Delco-Remy, 818002.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 633-G

Breaker—Contact separation .018 to .022 inch.
 Contact Spring Tension—17 to 22 oz.
 Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 19. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when piston is .043 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
 Spark Plugs—Metric (AC type G-12); Gap .025 inch.
 Firing Order—1-5-3-6-2-4.
 Manual Advance—15 degrees (on Flywheel).
 Automatic Advance—31 degrees (on Flywheel).
 Eng R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance (on cam)

700	0	350	0
1000	5	500	2 1/2
1200	8	600	4
1600	15	800	7 1/2
2000	21	1000	10 1/2
2400	28	1200	14
2600 (Max.)	31	1300	15 1/2

Coil—Delco-Remy, 528-B.

Ignition Switch—Delco-Remy "Electrolock" 427-E (1930); 427-H (1931, internal circuits as shown).

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 943-J. (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts
0	575	6.5
5	850	7.1
12	1250	7.8
16	1650	8.
18	1850 (Max.)	8.2

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—4 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 817221.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-H

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-E.

Location—Behind instrument board. Operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back.

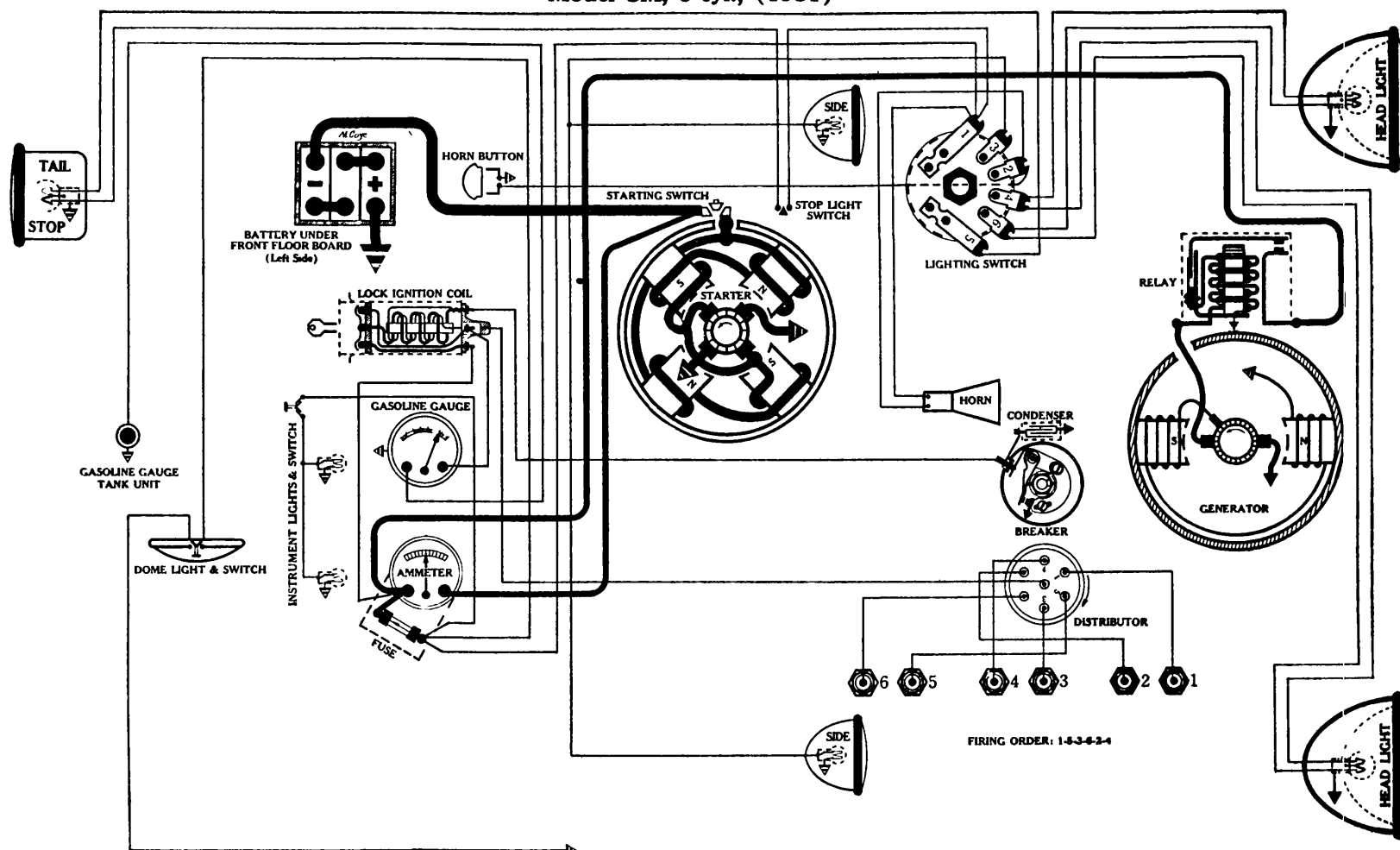
Foot Dimming Switch—Delco-Remy, 465-H.

Location—On toe board (left side). Tilt beam controlled by pressing plunger by foot.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; STOP—87; TAIL—63; INSTRUMENT—63; DOME—87.

CHRYSLER

Model CM, 6 cyl., (1931)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded.

Starting Capacity—98 amps. for 20 minutes.

Lighting Capacity—5 amps. for 17 hours.

Box—Length, 9 1/16; width, 7 1/16; height, 8 3/8 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 725-Q

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—165 to 185 amps. at 4.2 volts.

Lock Torque—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 632-K

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Contact Spring Tension—17 to 21 oz.

Timing with MOTOR GAUGE—Remove 1/8 inch pipe plug in cylinder head above No. 6 piston, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 6 piston is coming up on exhaust stroke. Stop when .034 inch before T.D.C., as indicated on Gauge (low compression engines), or .026 inch before T.D.C. (for "Red Head" high compression engines). With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (AC type G-12); Gap .022 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—18 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	0	400	0
1000	2	500	1
1400	6	700	3
1800	10	900	5
2200	15	1100	7 1/2
2500 (Max.)	18	1250	9

Lock Ignition Coil—Delco-Remy, 526-T.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 943-R. (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts
0	750	6.5
5	1000	7.2
11	1200	7.9
15	1400	8.
17	2000 (Max.)	8.2

Motoring Freely—4 to 5 amps. at 6 volts.

Max. Stall Current—19 to 20 amps. at 6 volts.

Field Test—3 1/2 to 4 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9150.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

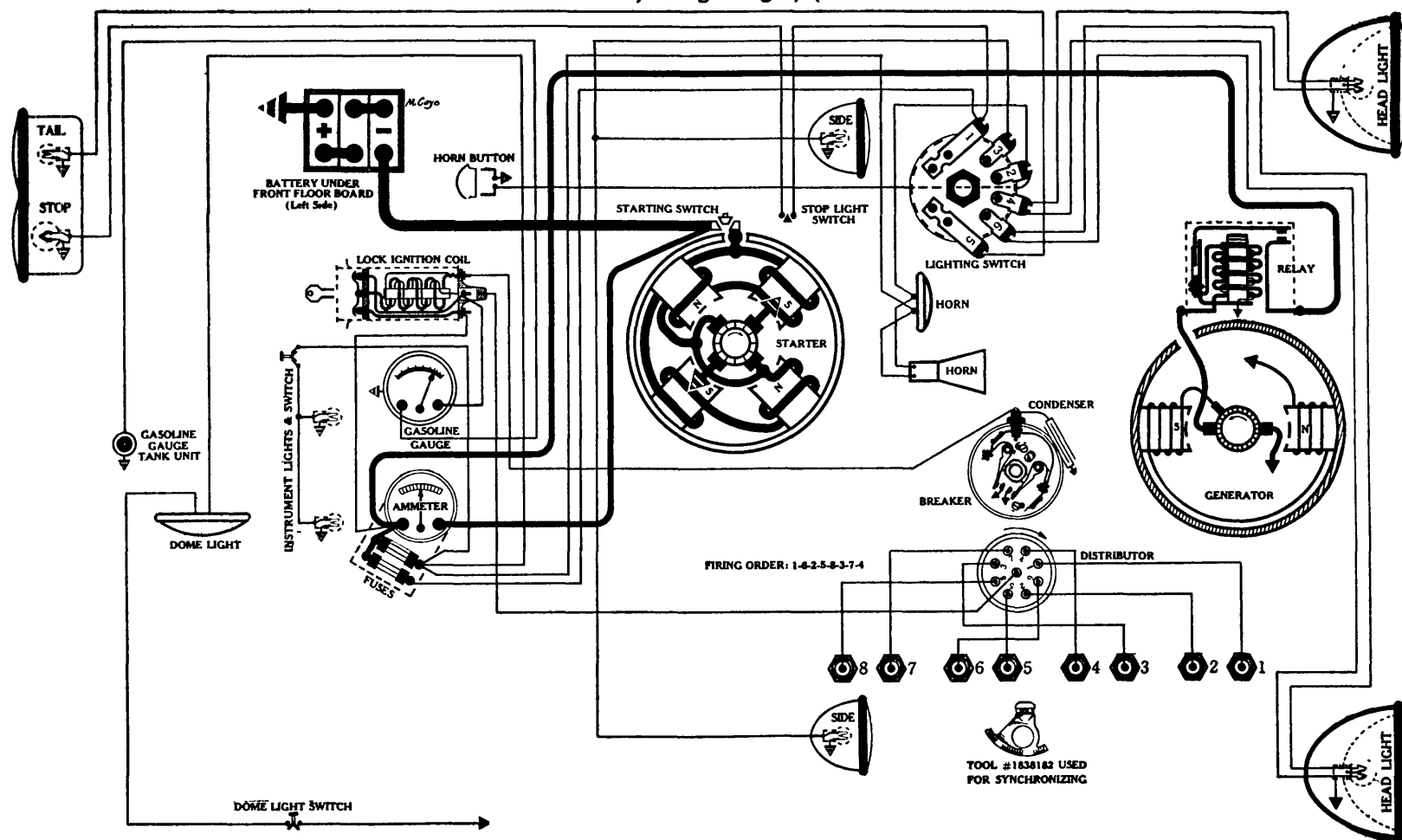
Fuses—Single 20 amp. fuse (type 3A-20) mounted below ammeter, behind instrument board.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

NOTE:—This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

CHRYSLER

Model CD, Straight Eight, (1930-31)



BATTERY

Willard, WS-4-17, 6 volts. Positive Terminal Grounded.
Starting Capacity—130 amps. for 20 minutes.
Lighting Capacity—5 amps. for 23½ hours
Box—Length, 11 11/16; width, 7 1/16; height, 8¾ inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 728-K

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on starter. This is a gear reduction job.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—150 to 160 amps. at 4.4 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 660-G

(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary timing with MOTOR GAUGE—Remove ¾ inch pipe plug in cylinder head above No. 8 piston, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 3. Slowly hand crank engine until No. 8 piston is coming up on exhaust stroke. Stop when .048 inch before T.D.C., as indicated on Gauge (silver dome cylinder head).

With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (AC type G-9); Gap .022 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	0	400	0
1200	4	600	2
1800	8	900	4
2400	13	1200	6½
2800	16	1400	8
3200 (Max.)	20	1600	10

Lock Ignition Coil—Delco-Remy, 526-T.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 943-R. (Belt Drive)

Performance Data—Gen. cold. No thermostat.			
Amps.	R.P.M.	Volts	
0	750	6.5	
5	1000	7.2	
11	1200	7.9	
15	1400	8.	
17	2000 (Max.)	8.2	

Motoring Freely—4 to 5 amps. at 6 volts.

Max. Stall Current—19 to 20 amps. at 6 volts.

Field Test—3½ to 4 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9150.

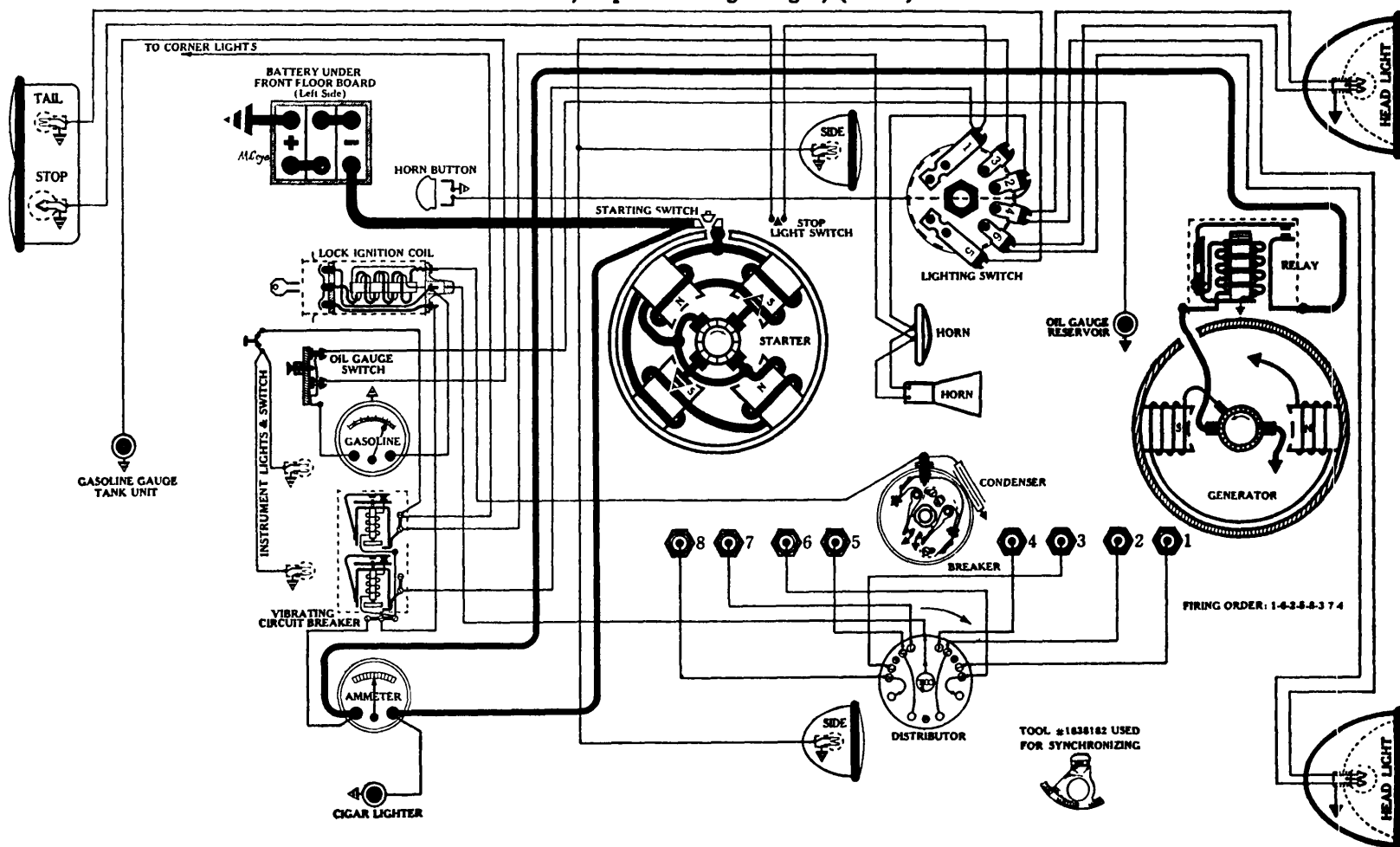
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two 20 amp. fuses (type 3A-20) mounted below ammeter, behind instrument board.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; CORNER—63; STOP—87; TAIL—63.

CHRYSLER

Model CG, Imperial Straight Eight, (1931)



BATTERY

Willard, SJWR-6, 6 volts. Positive Terminal Grounded.
Starting Capacity—166 amps. for 20 minutes.
Lighting Capacity—5 amps. for 30 hours.
Box—Length, 13; width, 7 1/16; height, 9 3/4 inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 728-N

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on starter. This is a gear reduction job.
Running Free—70 amps. at 5 volts, 2500 R.P.M.
Cranking Engine—150 to 160 amps. at 4.4 volts.
Lock Torque—28 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 16210.
Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 660-S

Breakers—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove 1/8 inch pipe plug in cylinder head above No. 8 piston, and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12. Slowly hand crank engine until No. 8 piston is coming up on exhaust stroke. Stop when .047 inch before T D C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—Metric (AC type G-12); Gap .022 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—25 degrees (on Flywheel).
Automatic Advance—20 degrees (on Flywheel).
Eng R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance (on flywheel) (on cam)

800	0	400	0
1200	5	600	2 1/2
1600	9	800	4 1/2
2000	14	1000	7
2500 (Max.)	20	1250	10

Lock Ignition Coil—Delco-Remy, 526-T.

NOTE—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 957-U, (Belt Drive)

Performance Data—Gen. cold. No thermostat.			
Amps.	R.P.M.	Volts	
0	750	6.5	
5	1000	7.2	
11	1200	7.9	
15	1400	8.	
17	2000 (Max.)	8.2	

Motoring Freely—3 1/2 to 4 amps. at 6 volts.
Max. Stall Current—19 to 20 amps. at 6 volts.
Field Test—3 to 3 1/2 amps. at 6 volts across field coils in series.
Brush Spring Tension—24 to 28 oz. on each.
Armature—Delco-Remy, 1836971.
Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-N

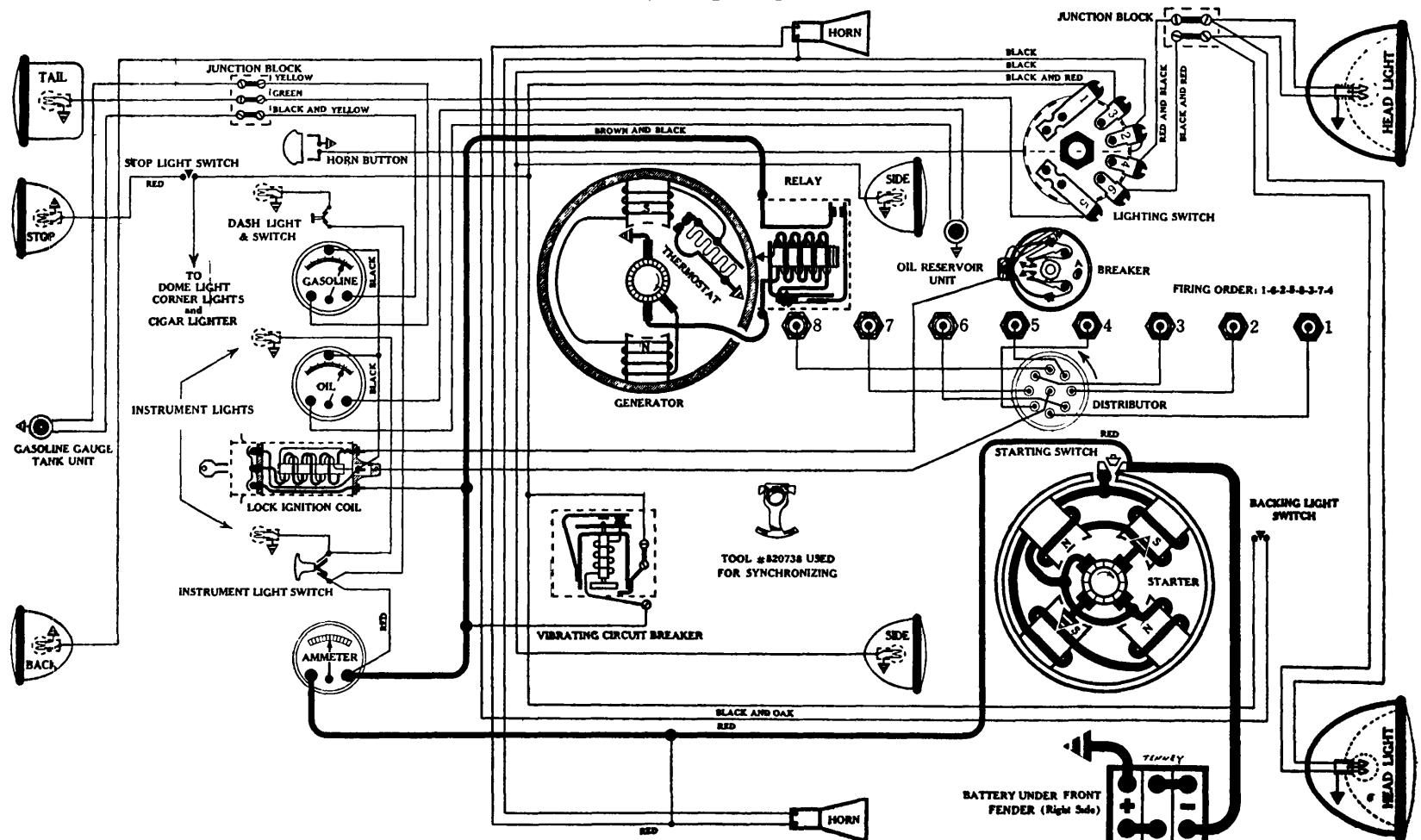
Closes—7 to 7 1/2 volts.
Opens—0 to 2 1/2 amps. discharge.
Contact Gap—.015 to .025 inch.
Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9150.
Location—Foot of steering column. Lights controlled by lever on steering wheel.
Vibrating Circuit Breakers—Delco-Remy, 410-H. Start—25 to 30 amps. Operate—10 to 15 amps.
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME OR CORNER—63; STOP—87; TAIL—63.

CORD

Model L-29, Straight Eight, (1931-32)



BATTERY

U. S. L., XY-15-X-6, 6 volts. Positive Terminal Grounded.
 Starting Capacity—119 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 21 hours
 Box—Length, 10 7/16; width, 7 1/4; height, 9 1/4 inches.

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 724-N
 Connection to Engine—Bendix Drive.
 NOTE:—Gear reduction starter. A pinion cut on the armature shaft drives a gear on bendix shaft.
 Running Free—70 amps. at 5 volts, 3500 R.P.M.
 Cranking Engine—150 to 170 amps. at 4.6 volts.
 Lock Torque—22 pound-feet, 600 amps., 3 volts.
 Brush Spring Tension—24 to 28 oz. on each.
 Starting Switch—Delco-Remy, 16210.
 Armature—Delco-Remy, 818134.

IGNITION

Rotation, L. H., Top View
 Delco-Remy, 658-W
 Breakers—Contact separation .020 inch.
 Contact Spring Tension—18 to 20 oz. on each.
 Synchronizing—Movable points open 45 degrees after stationary.
 Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 29. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .060 inch before T.D.C., as indicated on gauge. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
 Spark Plugs—Metric Standard (Champion No. 8); Gap .025 inch.
 Firing Order—1-6-2-5-8-3-7-4.
 Manual Advance—15 degrees (on Flywheel).
 Automatic Advance—17 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	0	400	0
1200	2	600	1
1800	6	900	3
2400	10	1200	5
3000	14	1500	7
3600 (Max.)	17	1800	8.5

Ignition Lock Coil—Delco-Remy, 526-V.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, R. H., Com. End
 Delco-Remy, 957-J

Performance Data—Gen. cold. Thermostat closed					
Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	14	1400	7.9
5	800	7.1	16	1600 (Max.)	8.
9	1000	7.5	15	1800	8.
12	1200	7.8			

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 1/2 amps at 6 volts across field coils in series

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 1837266.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-J

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5650-A.

Location—Foot of steering column. Lights controlled by round disc on steering wheel.

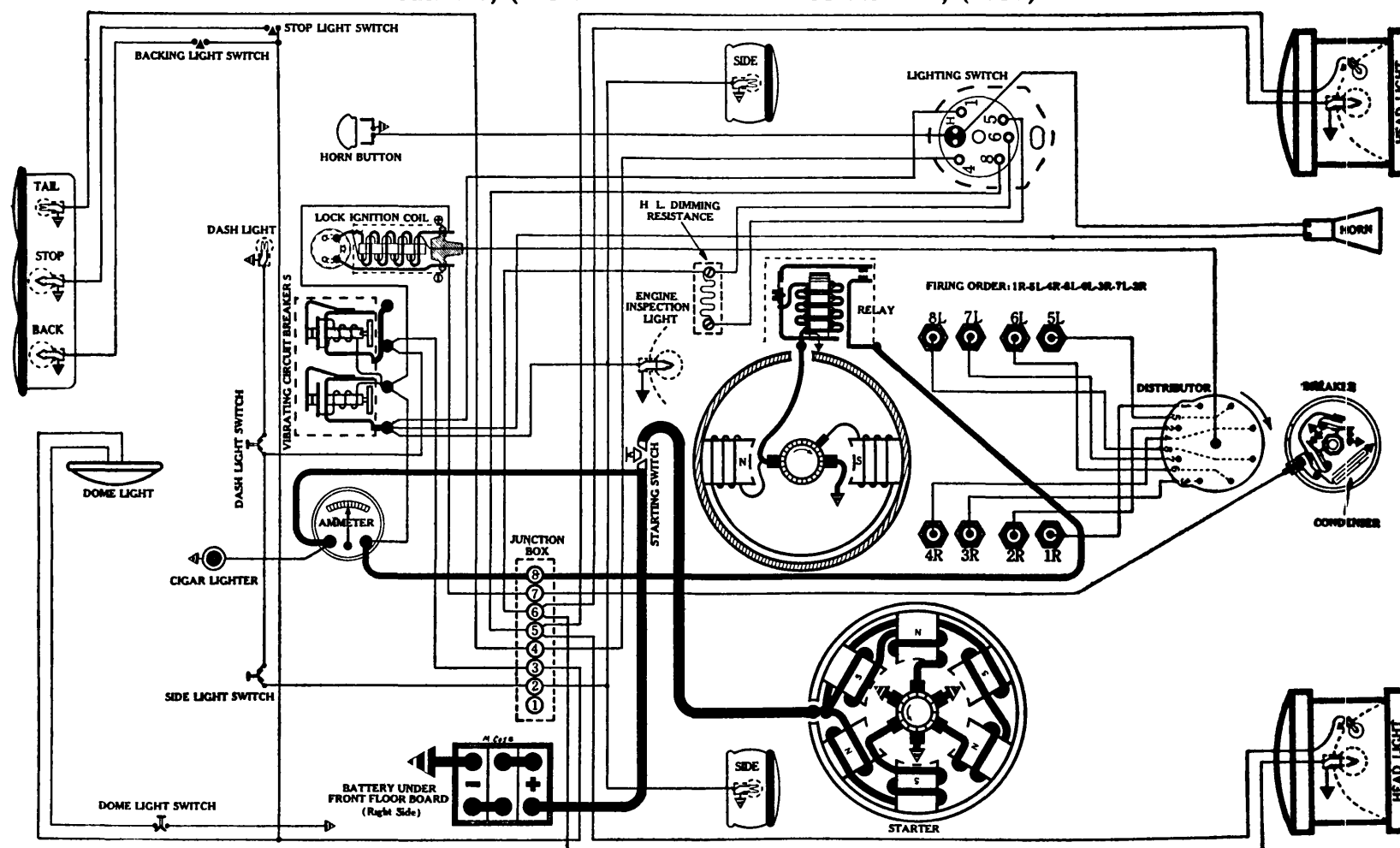
Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; STOP—87; BACK—87; TAIL—63; INSTRUMENT—63.

CUNNINGHAM

Model V-9, (1931)

Model V-10, (1932)



BATTERY

Willard, RJ-4-15, 6 volts. Negative Terminal Grounded.
 Starting Capacity—145 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 28 hours
 Box—Length 11 11/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 350

Connection to Engine—Bendix Drive.
 Running Free—55 amps. at 6 volts, 4000 R.P.M.
 Cranking Engine—245 to 260 amps. at 4.1 volts.
 Lock Torque—21 1/2 pound-feet, 475 amps. at 3 volts.
 Brush Spring Tension—24 to 26 oz. on each.
 Starting Switch—Delco-Remy, 406-G.
 Armature—Delco-Remy, 16843.

IGNITION

Rotation, R. H., Top View
 North East, Model TEU, Type 10874

IMPORTANT NOTE:—This unit uses an eight lobe cam with two sets of breaker arms connected in parallel. They operate simultaneously, and no provision is made for synchronizing.

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 22 oz. on each.

Timing—With No. 1 Piston on T.D.C. compression stroke, spark lever fully advanced, rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 1. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .055 inch before T.D.C., as indicated on Gauge. With spark fully retarded, rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.

Firing Order—1R-5L-4R-8L-6L-3R-7L-2R.

Spark Plugs—3/8 inch regular (Champion No. 2); Gap .025 inch.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—21 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	0	200	0
800	3	400	1.5
1600	8	800	4
2000	11	1000	5.5
2400	14	1200	7
3000	18	1500	9
3400 (Max.)	21	1700	10.5

Lock Ignition Coil—North East, Type 5023660.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, R. H., Com. End
 Delco-Remy, 285

Performance Data—Gen. hot; add 3 amps. for cold test.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	550	6.5	16	1400 (Max.)	8.
3	600	7.	18-20	1000	8.4
10	900	7.6	Average	13	

Motoring Freely—4 1/2 to 6 amps. at 6 volts.

Max. Stall Current—17 to 19 amps. at 6 volts.

Field Test—2 1/2 to 3 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 16266.

Third Brush Adjustment—Loosen cover band. See Fig. 9, P. 6, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-D.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

Circuit Breakers—Delco-Remy, 5759.

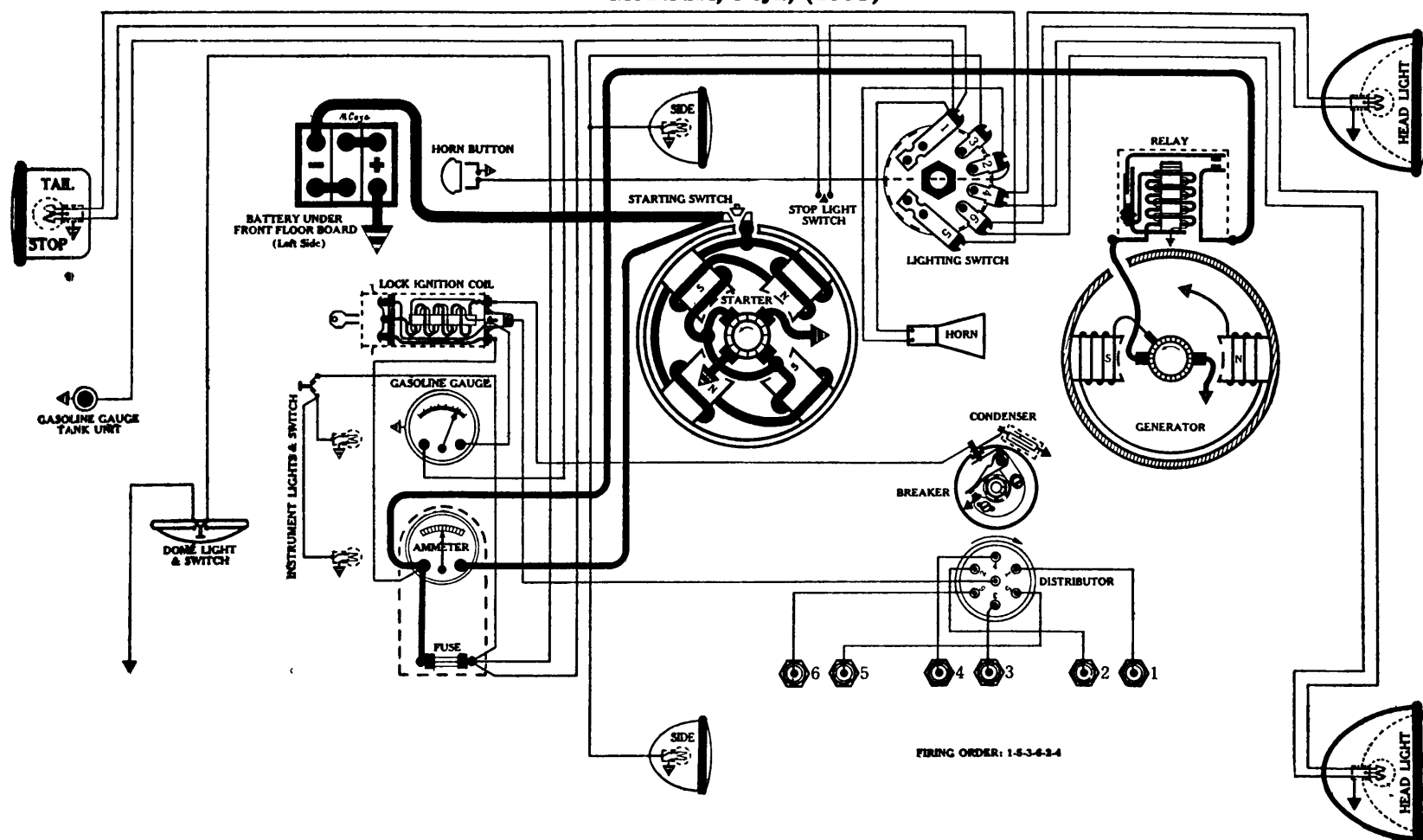
Vibrating—Starts 25 to 30 amps. Operates 10 to 15.

Lockout—Starts 25 to 30 amps. Operates with discharge less than 1 amp.

Lamps—See P. 3, Sec. AA. HEAD—1129; AUX.—63; SIDE—63; INSTRUMENT—63; ENGINE INSPECTION—1129; TAIL—63; STOP—1129; BACK—1129; DOME—64.

DE SOTO

Model SA, 6 cyl., (1931)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded.

Starting Capacity—98 amps. for 20 minutes.

Lighting Capacity—5 amps. for 17 hours.

Box—Length, 9 1/16; width, 7 1/16; height, 8 7/8 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 725-Q

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—165 to 185 amps. at 4.2 volts.

Lock Torque—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 632-K or 632-L

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Contact Spring Tension—17 to 21 oz.

Timing with MOTOR GAUGE—Remove 1/8 inch pipe plug in cylinder head above No. 6 piston, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 6 piston is coming up on exhaust stroke. Stop when .055 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (AC type G-11); Gap .022 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—18 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	0	400	0
1000	2	500	1
1400	6	700	3
1800	10	900	5
2200	15	1100	7 1/2
2500 (Max.)	18	1250	9

Lock Ignition Coil—Delco-Remy, 526-T.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 943-R, (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts
0	750	6.5
5	1000	7.2
11	1200	7.9
15	1400	8.
17	2000 (Max.)	8.2

Motoring Freely—4 to 5 amps. at 6 volts.

Max. Stall Current—19 to 20 amps. at 6 volts.

Field Test—3 1/2 to 4 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—1 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9150.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

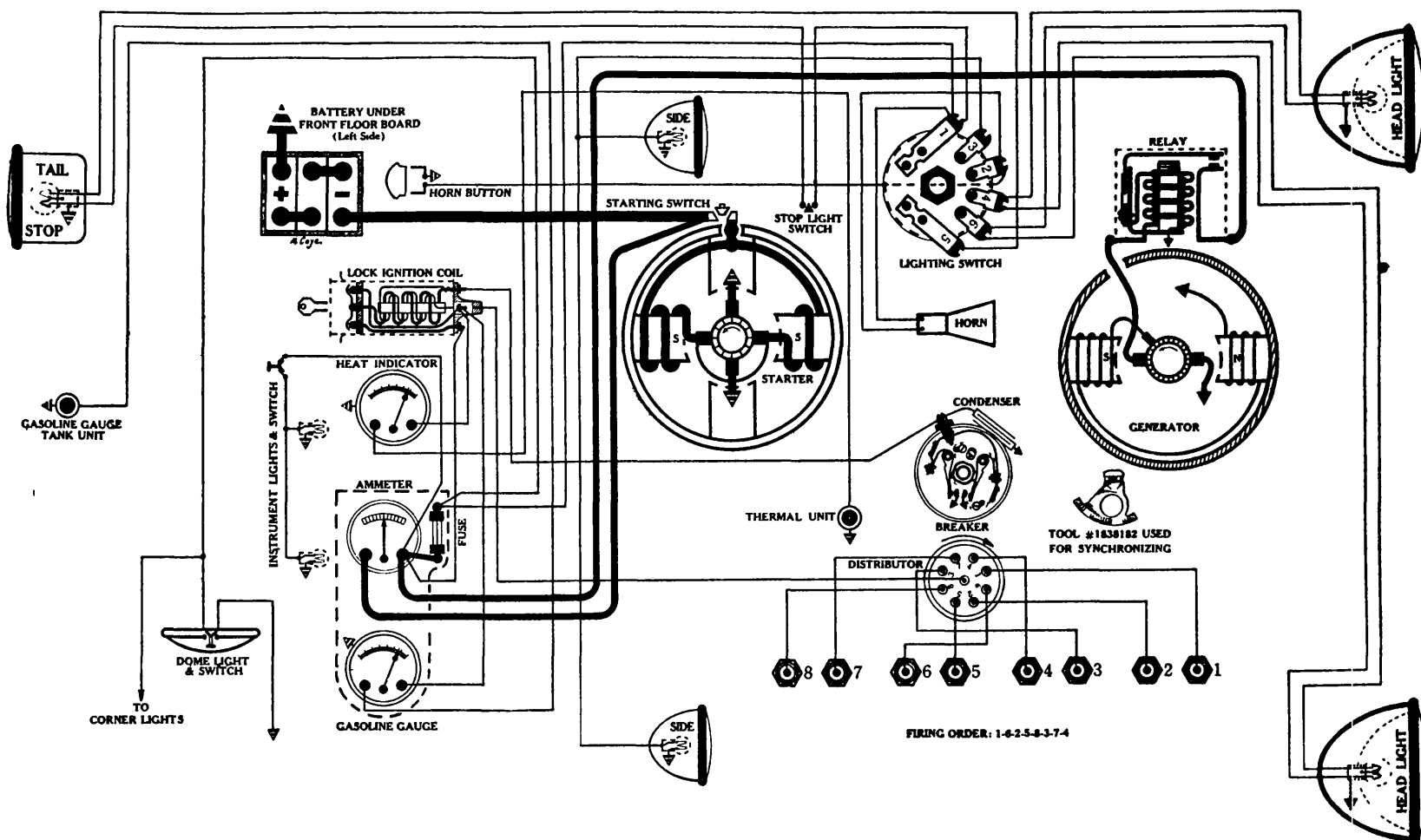
Fuses—Single 20 amp. fuse (type 3A-20) mounted below ammeter, behind instrument board.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

NOTE:—This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

DE SOTO

M del CF, Straight Eight, (1931)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7 1/16; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-Q

Connection to Engine—Mechanical gear shift incorporating over-running disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—160 to 180 amps. at 4.2 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 660-D

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove 1/4 inch pipe plug in cylinder head above No. 8 piston, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 29. Slowly hand crank engine until No. 8 piston is coming up on exhaust stroke. Stop when .060 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (AC type G-10); Gap .022 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—23 degrees (on Flywheel).

Automatic Advance—14 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
1000	0	500	0
1500	4	750	2
2000	8	1000	4
2500	12	1250	6
2800 (Max.)	14	1400	7

Lock Ignition Coil—Delco-Remy, 526-N.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 943-R, (Belt Drive)

Performance Data—Gen. cold		No thermostat	
Amps.	R.P.M.		Volts
0	750		6.5
5	1000		7.2
11	1200		7.9
15	1400		8.
17	2000 (Max.)		8.2

Motoring Freely—4 to 5 amps. at 6 volts.

Max. Stall Current—19 to 20 amps. at 6 volts.

Field Test—3 1/2 to 4 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9150.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

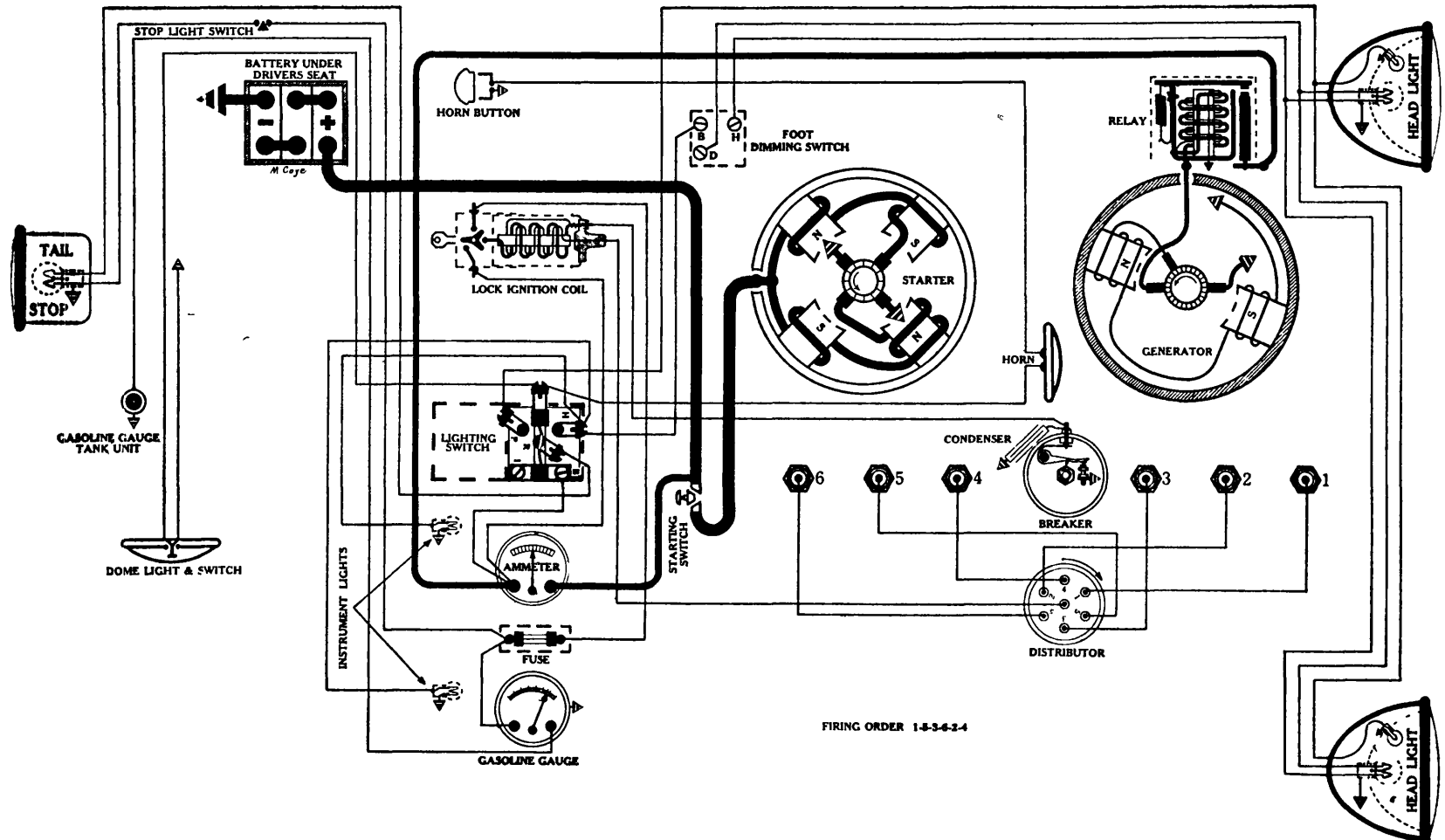
Fuses—Single 20 amp. fuse (type 3A-20) mounted vertically beside ammeter, behind instrument board.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; CORNER—63; STOP AND TAIL—1158.

NOTE:—This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

DE VAUX

Model 6-75, 6 cyl., (1931-32)



BATTERY

Prest-O-Lite, 6-15-J, 6 volts. Negative Terminal Grounded.
Starting Capacity—119 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4037

Connection to Engine—Bendix Drive.
Running Free—60 amps. at 6 volts, 4150 R. P. M.
Cranking Engine—160 to 170 amps. at 4.1 volts.
Lock Torque—17 pound-feet, 520 amps. at 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Auto-Lite, SW-4001.
Armature—Auto-Lite, MAB-2006.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGB-4031-A

Breakers—Contact separation .018 inch.
Contact Spring Tension—17 to 19 oz.
Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .011 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—Metric (Champion, type C-7); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Manual Advance—20 degrees (on Flywheel).
Automatic Advance—15 degrees (on Flywheel).
Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance (on flywheel) (on cam)

600	0	300	0
1200	4	600	2
1800	8	900	4
2400	12	1200	6
2800 (Max.)	15	1400	7 1/2

Lock Ignition Coil—Auto-Lite, IG-4302.

NOTE:—This is a new type coil, with but one primary terminal at top, which should always be connected to the breaker. Two other primary terminals are located at base of coil, either one of which may be used for the "hot" feed; the other terminal is for the gas gauge or other auxiliary units.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4330, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0	600	6.3
6	800	6.9
10	1000	7.1
13	1200	7.5
15	1400	7.7
17	1900 (Max.)	8.

Motoring Freely—4 1/2 to 5 amps. at 6 volts.
Max. Stall Current—16 to 19 amps. at 6 volts.
Field Test—4 1/2 amps. at 6 volts across field coils in series.
Field Fuse—(None).
Brush Spring Tension—10 to 13 oz. on each.
Armature—Auto-Lite, GAL-2141.
Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

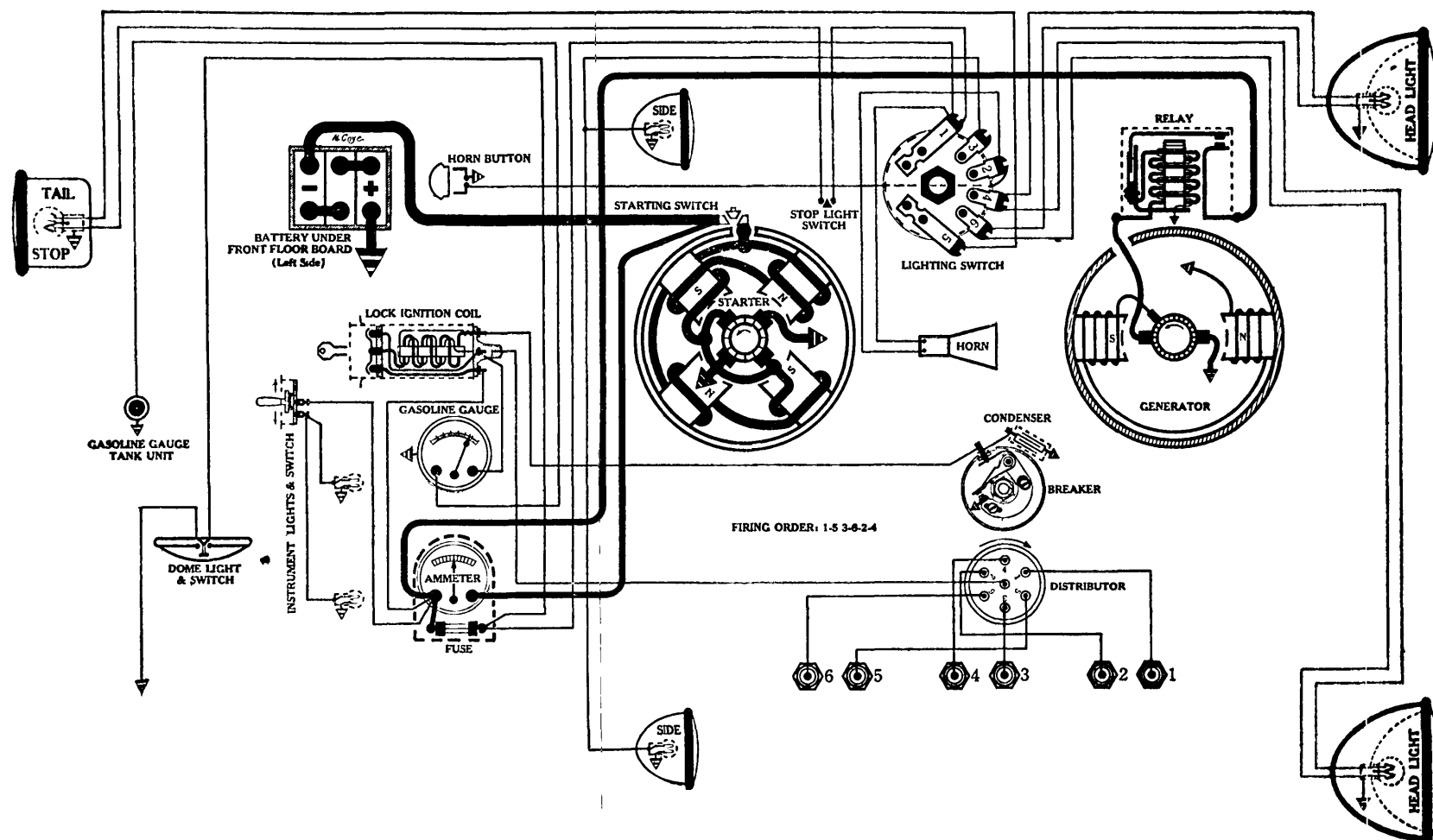
Closes—7 to 7 1/2 volts.
Opens—1/2 to 2 1/2 amps. discharge
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5670-AA.
Location—Behind instrument board. Operated by pull knob.
Fuses—(Horn & Lighting), Single 20 amp. (type 3A-20), mounted on switch back. (Stop Light and Gas Gauge), Single 20 amp. (type 3A-20), mounted on block behind instrument board.
Foot Dimming Switch—Clum No. 9251.
Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.
NOTE:—This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

DODGE

Model DH, 6 cyl., (1931)



BATTERY

Willard, W3-1-13, 6 volts. Positive Terminal Grounded.
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17 hours
Box—Length, 9 1/16; width, 7 1/16; height, 8 3/8 inches

STARTER

Rotation, L. H., Com. End
Delco-Remy, 725-Q

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—165 to 185 amps. at 4.2 volts.

Lock Torque—16 pound-feet, 600 amps. at 3 volts

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 632-K

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Contact Spring Tension—17 to 21 oz

Timing with MOTOR GAUGE—Remove 3/8 inch pipe plug in cylinder head above No. 6 piston, and attach MOTOR GAUGE, using adapter No. 101 and rod No. 2. Slowly hand crank engine until No. 6 piston is coming up on exhaust stroke. Stop when .032 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (AC type G-11); Gap .022 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—18 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	0	400	0
1000	2	500	1
1400	6	700	3
1800	10	900	5
2200	15	1100	7 1/2
2500 (Max.)	18	1250	9

Lock Ignition Coil—Delco-Remy, 533-V.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 943-R. (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts
0	750	6.5
5	1000	7.2
11	1200	7.9
15	1400	8.
17	2000 (Max.)	8.2

Motoring Freely—4 to 5 amps. at 6 volts.

Max. Stall Current—19 to 20 amps. at 6 volts.

Field Test—3 1/2 to 4 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9150.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

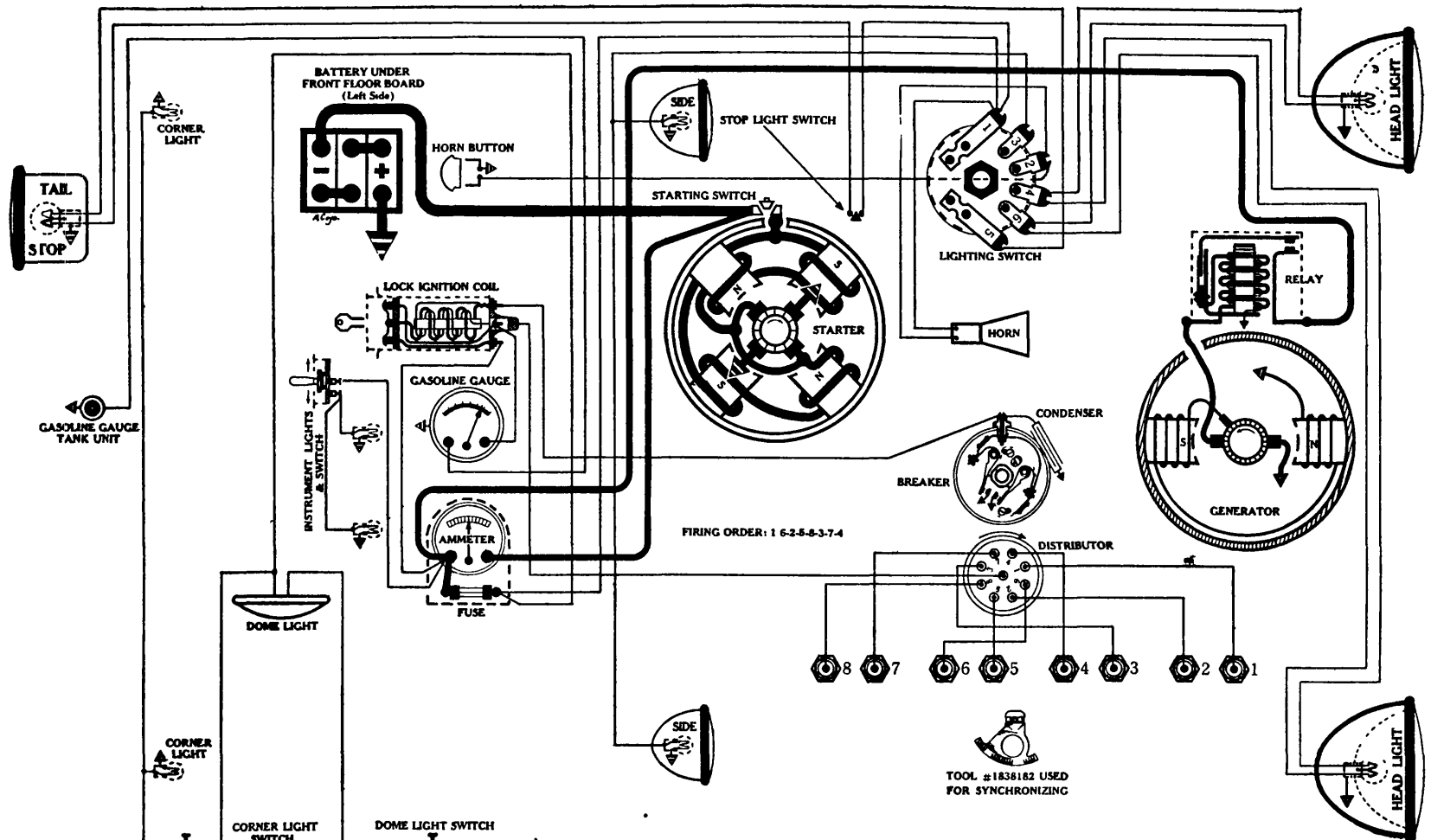
Fuses—Single 20 amp. fuse (type 3A-20) mounted below ammeter, behind instrument board.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

NOTE:—This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

DODGE

Model DG, Straight Eight, (1931)



BATTERY
Willard, WS-4-17, 6 volts. Positive Terminal Grounded.
Starting Capacity—130 amps. for 20 minutes.
Lighting Capacity—5 amps. for 23½ hours.
Box—Length, 11 11/16; width, 7 1/16; height, 8 ¾ inches

STARTER
Rotation, R. H., Com. End
Delco-Remy, 728-K
Connection to Engine—Mechanical gear shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter. This is a gear reduction job.
Running Free—70 amps. at 5 volts, 2500 R.P.M.
Cranking Engine—150 to 160 amps. at 4.4 volts.
Lock Torque—28 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 820052.
Armature—Delco-Remy, 818134.

IGNITION
Rotation, R. H., Top View
Delco-Remy, 660-G
(Full Automatic Spark Advance)
Breakers—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing with MOTOR GAUGE—Remove ½ inch pipe plug in cylinder head above No. 8 piston, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 29. Slowly hand crank engine until No. 8 piston is coming up on exhaust stroke. Stop when .019 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (AC type G-10); Gap .022 inch.
Firing Order—1-6-2-5-8-3-7-4.
Automatic Advance—20 degrees (on Flywheel).
Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance (on flywheel) (on cam)

800	0	400	0
1200	4	600	2
1800	8	900	4
2400	13	1200	6½
2800	16	1400	8
3200 (Max.)	20	1600	10

Lock Ignition Coil—Delco-Remy, 533-V.
NOTE:—This unit is a combined ignition switch and coil. Impossible to “jump out” ignition switch with wire to run engine. Coil has three “primary” terminals marked “Bat.,” “Gauge,” and “Timer.” Coil must be connected as marked.

GENERATOR
Rotation, L. H., Com. End
Delco-Remy, 943-R, (Belt Drive)
Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts
0	750	6.5
5	1000	7.2
11	1200	7.9
15	1400	8.
17	2000 (Max.)	8.2

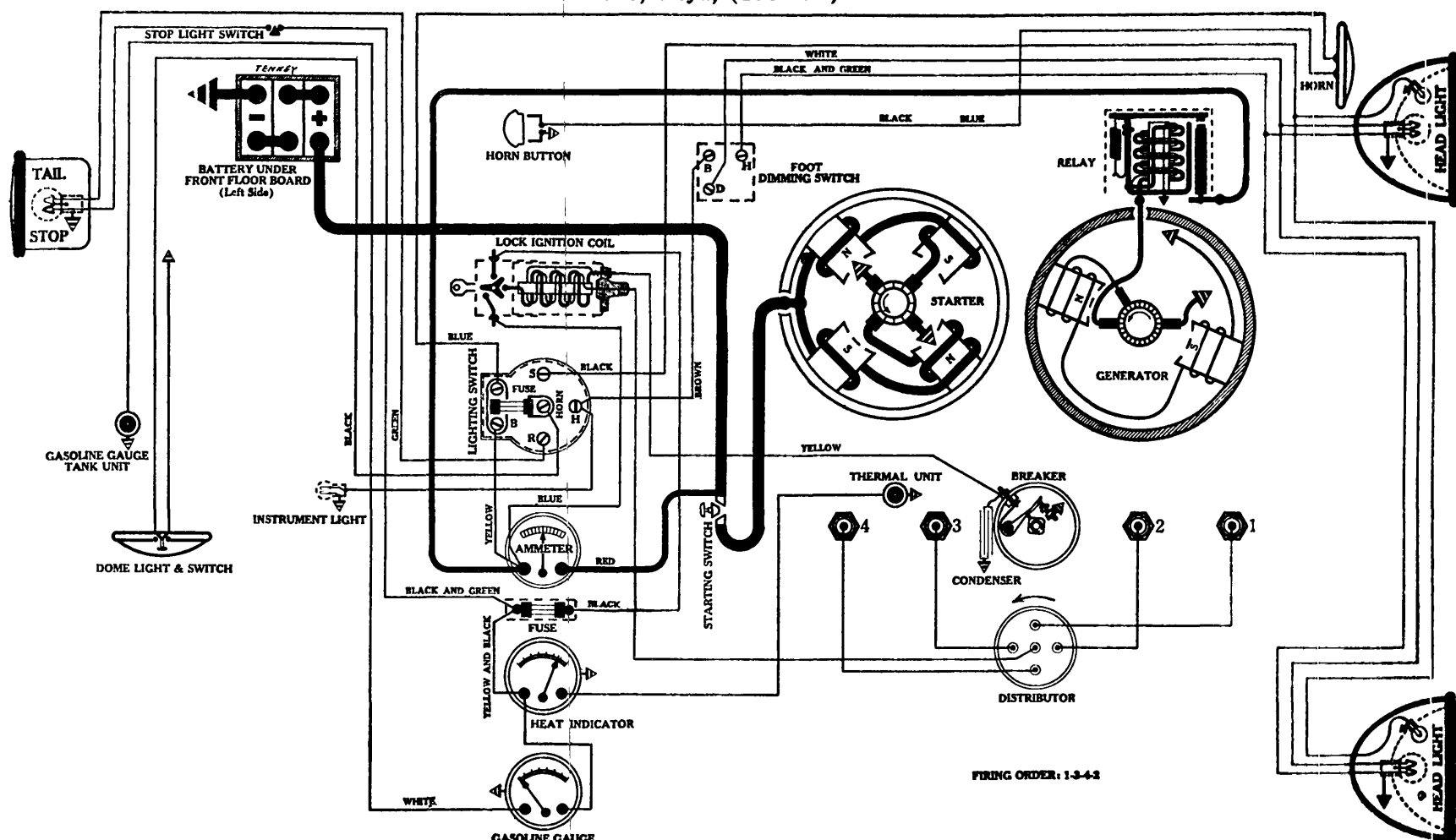
Motoring Freely—4 to 5 amps. at 6 volts.
Max. Stall Current—19 to 20 amps. at 6 volts.
Field Test—3½ to 4 amps. at 6 volts across field coils in series.
Brush Spring Tension—24 to 28 oz. on each.
Armature—Delco-Remy, 1838448.
Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY
Delco-Remy, 265-G
Closes—7 to 7½ volts.
Opens—0 to 2½ amps. discharge.
Contact Gap—.015 to .025 inch.
Core Gap—.014 to .018 inch, contacts closed.

LIGHTING
Switch—Clum, No. 9150.
Location—Foot of steering column. Lights controlled by lever on steering wheel.
Fuses—Single 20 amp. fuse (type 3A-20) mounted below ammeter, behind instrument board.
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; CORNER—63; STOP AND TAIL—1158.
NOTE:—This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

DURANT

Model 610, 4 cyl., (1931-32)



BATTERY

U. S. L., 3-CVX-6X-7A, 6 volts. Negative Terminal Grounded.

Starting Capacity—115 amps. for 20 minutes.

Lighting Capacity—5 amps. for 21 hours.

Box—Length, 10 7/16; width, 7 7/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAJ-4007

Connection to Engine—Bendix drive.

Running Free—50 amps. at 5.5 volts.

Cranking Engine—160 amps. at 5.25 volts, 228 R. P. M.

Lock Torque—12 1/2 pound-feet, 575 amps., 3 volts.

Brush Spring Tension—44 to 48 oz. on each.

Starting Switch—Auto-Lite, SW-4003.

Armature—Auto-Lite, MAJ-2048.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGB-4043

Breakers—Contact separation .020 inch.

Contact Spring Tension—17 to 19 oz.

Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .021 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—3/4 inch (Champion, type C-4); Gap .025 inch

Firing Order—1-3-4-2.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—24 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on dam)
600	0	300	0
1200	9	600	4.5
1600	15	800	7.5
2000	21	1000	10.5
2200 (Max.)	24	1100	12

Lock Ignition Coil—Auto-Lite, IG-4302.

NOTE—This is a new type coil, with but one primary terminal at top, which should always be connected to the breaker. Two other primary terminals are located at base of coil, either one of which may be used for the "hot" feed; the other terminal is for the gas gauge or other auxiliary units.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4130, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	650	6.5	10	1075	7.3
2	720	6.6	14	1340	7.7
5	850	7	16	1800 (Max.)	8

Motoring Freely—4 1/2 to 5 amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—4 1/2 amps. at 6 volts across field coils in series.

Field Fuse—(None).

Brush Spring Tension—20 to 24 oz. on main; 30 to 34 oz. on third.

Armature—Auto-Lite, GAL-2141.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Clum, No. 5192 (interchangeable with Clum, No. 10741).

Location—Behind instrument board. Operated by pull knob.

Fuses—(Horn and Lighting), single 20 amp. fuse (type 3A-20), mounted on switch back. (Stop Light, Gas, and Heat Gauge), single 20 amp. fuse (type 3A-20), mounted on block behind instrument board.

Foot Dimming Switch—Clum, No. 9126.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

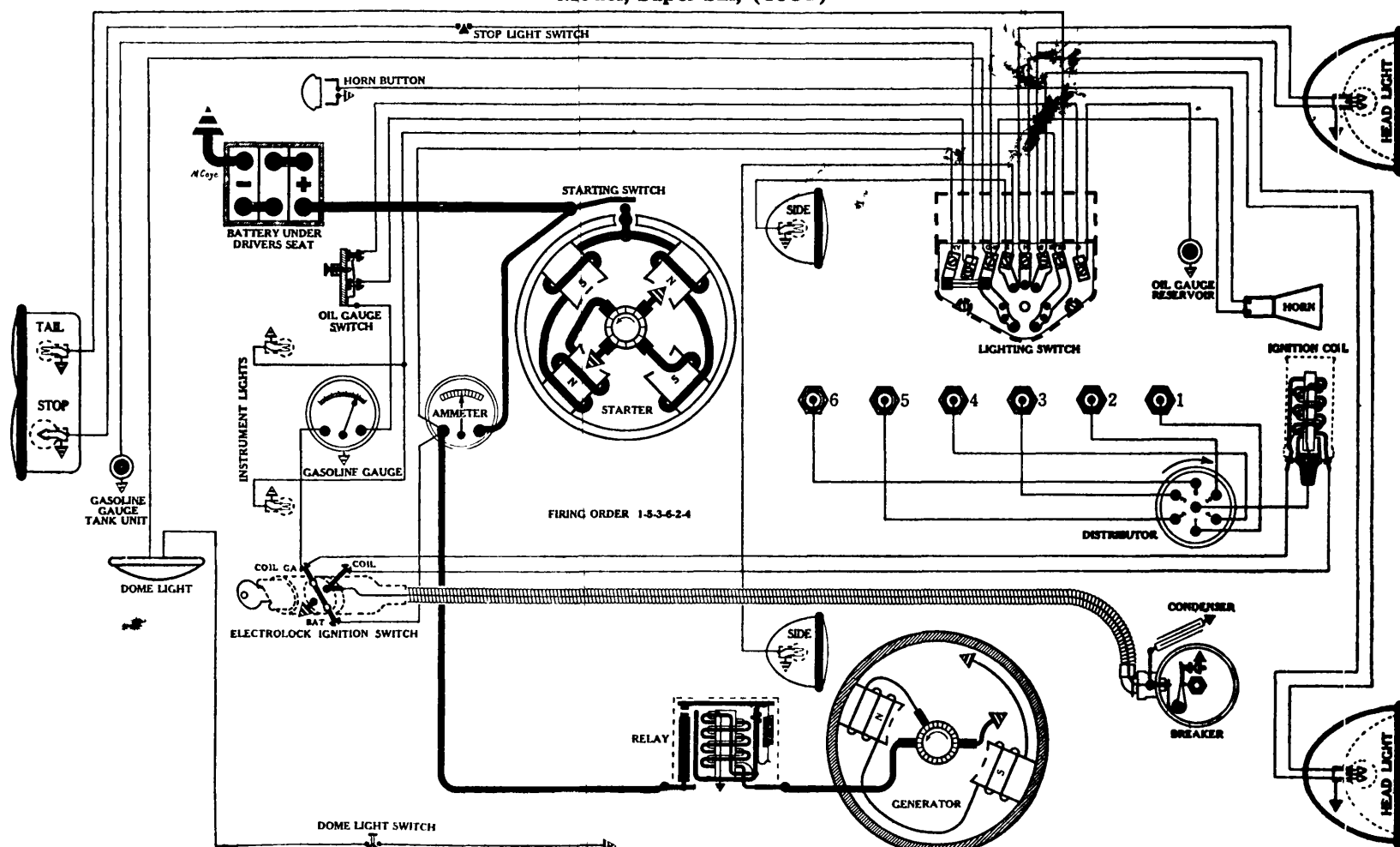
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

NOTE—This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

Models 612 and 614, 6 cyl., (1931-32)

ESSEX

Model, Super Six, (1931)



BATTERY
Exide, 3-VX 1-13-1, 6 volts. Negative Terminal Grounded.
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—5 amps. for 16½ hours.
Box—Length, 9 1/16; width, 7; height, 9 13/16 inches.

STARTER
Rotation, L. H., Com. End
Auto-Lite, MAJ-4009
Connection to Engine—Bendix Drive.
Running Free—50 amps. at 5.5 volts.
Cranking Engine—160 amps at 5.25 volts, 228 R.P.M.
Lock Torque—12½ pound-feet, 575 amps., 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Auto-Lite, MU-2208-S, mounted on starter. Operated by pull cable from instrument board.
Armature—Auto-Lite, MAJ-2049.

IGNITION
Rotation, R. H., Top View
Auto-Lite, IGB-4052
(Full Automatic Spark Advance)
Breaker—Contact separation .020 inch
Contact Spring Tension—17 to 19 oz.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—Metric (AC Type G-10); Gap .022 inch.
Firing Order—1-5-3-6-2-4.
Automatic Advance—20 degrees (on Flywheel).
Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance (on cam)

800	0	400	0
1200	2	600	1
2000	8	1000	1
2800	12	1400	6
3600	18	1800	9
4000 (Max.)	20	2000	10

Coil—Auto-Lite, IG-4087.
Switch—"Electrolock," type 9-B. For details of operation and instructions on servicing see P. 22, Sec. AA.

GENERATOR
Rotation, L. H., Com. End
Auto-Lite, GAM-4302

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	550	6.5	14	950	7.9
2	600	6.9	16	1100	8.
5	650	7.1	17	1350 (Max.)	8.
10	800	7.8			

Motoring Freely—4½ to 5½ amps. at 6 volts.
Max. Stall Current—18 to 19 amps. at 6 volts.
Field Test—4½ amps. at 6 volts across field coils in series.
Brush Spring Tension—20 to 24 oz. on main; 30 to 34 oz. on third.
Armature—Auto-Lite, GAM-2038.
Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

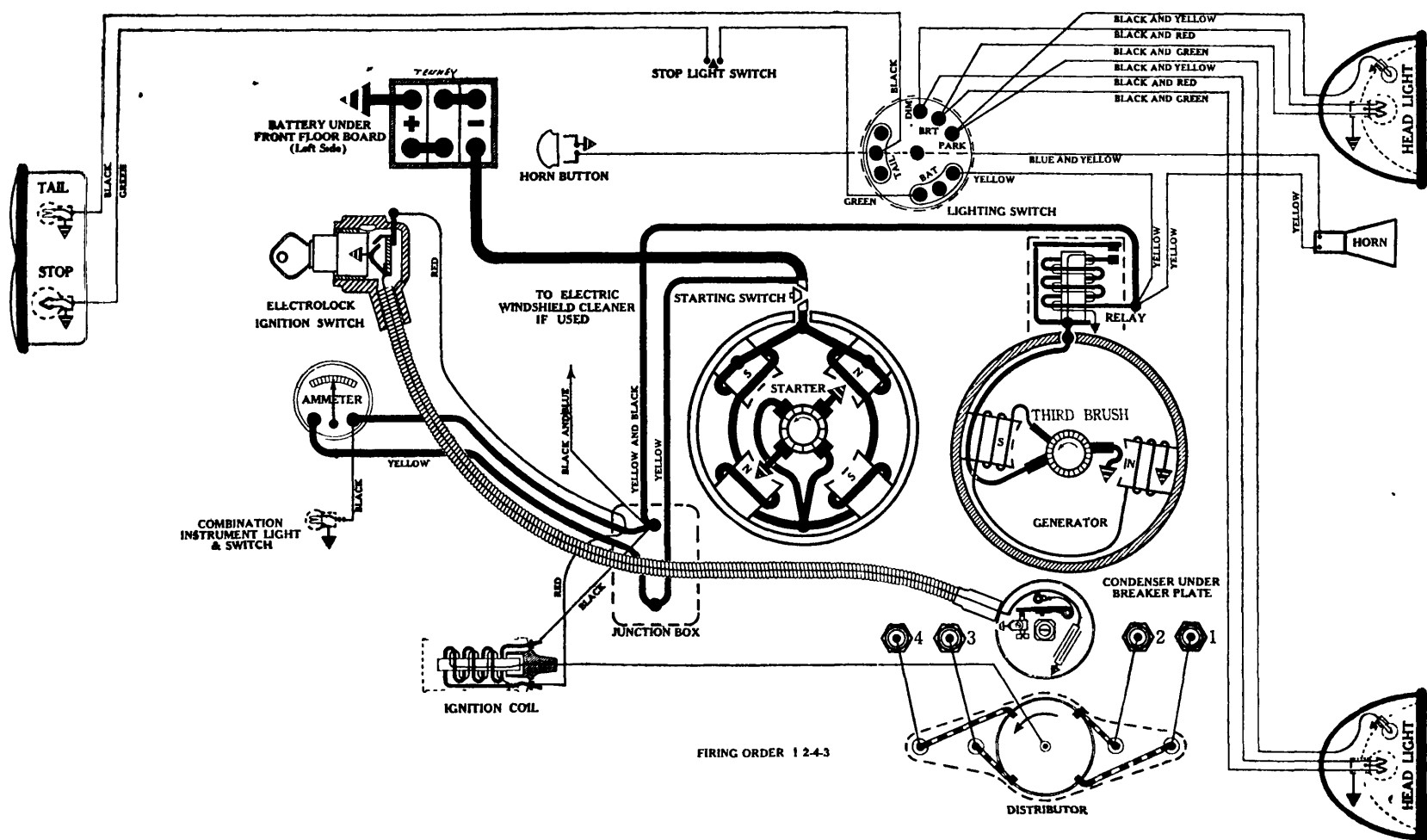
RELAY
Auto-Lite, CB-4016

Closes—7 to 7½ volts.
Opens—½ to 2½ amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, Nos. 8050-A or 8074-B.
Location—On frame under engine hood (left side). Lights controlled by lever on steering wheel.
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch face, under cover.
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; TAIL—63; INSTRUMENT—63; DOME—63; STOP—87.

Mod 1 A, (1931)



Ford, A-10655, 6 volts. Positive Terminal Grounded.
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17 hours.
Box—Length, 9¾; width, 7½; height, 9½ inches.

Connection to Engine—Bendix Drive.
Running Free—50 amps. at 6 volts, 4000 R.P.M.
Cranking Engine—145 to 165 amps. at 5.1 volts.
Lock Torque—15 pound-feet, 550 amps., 3.2 volts.
Brush Spring Tension—35 to 40 oz. on each.
Starting Switch—On starter, operated by foot plunger.
Armature—Ford, 11005-D.

Breaker—Contact separation .018 to .022 inch.
Timing—1—Check contact separation. **2—**Retard spark lever. **3—**Screw out TIMING PIN found in timing case cover, and insert rounded end in same hole. **4—**Hand crank engine until pin is felt to drop in recess in cam shaft gear. **5—**Remove Distributor cap and rotor button. **6—**Loosen cam locking screw. **7—**Replace rotor button and turn until metal strip is opposite No. 1 contact. **8—**Remove rotor button and turn cam slightly L. H. (top view) until contacts just open. **9—**Lock cam; assemble head; replace timing pin.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 7. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C., as indicated on Gauge. With spark fully retarded, rotor opposite No. 1 Dist. Outlet, breaker points should just open.

Spark Plugs— $\frac{7}{8}$ " special (AC type Z); Gap .035 inch.

Firing Order—1-2-4-3.

Manual Advance—40 degrees (on Flywheel).

Automatic Advance—None.

Coil—Auto-Lite-Bosch.

Ignition Switch—Special "Electrolock," Ford No. A-11575-E.

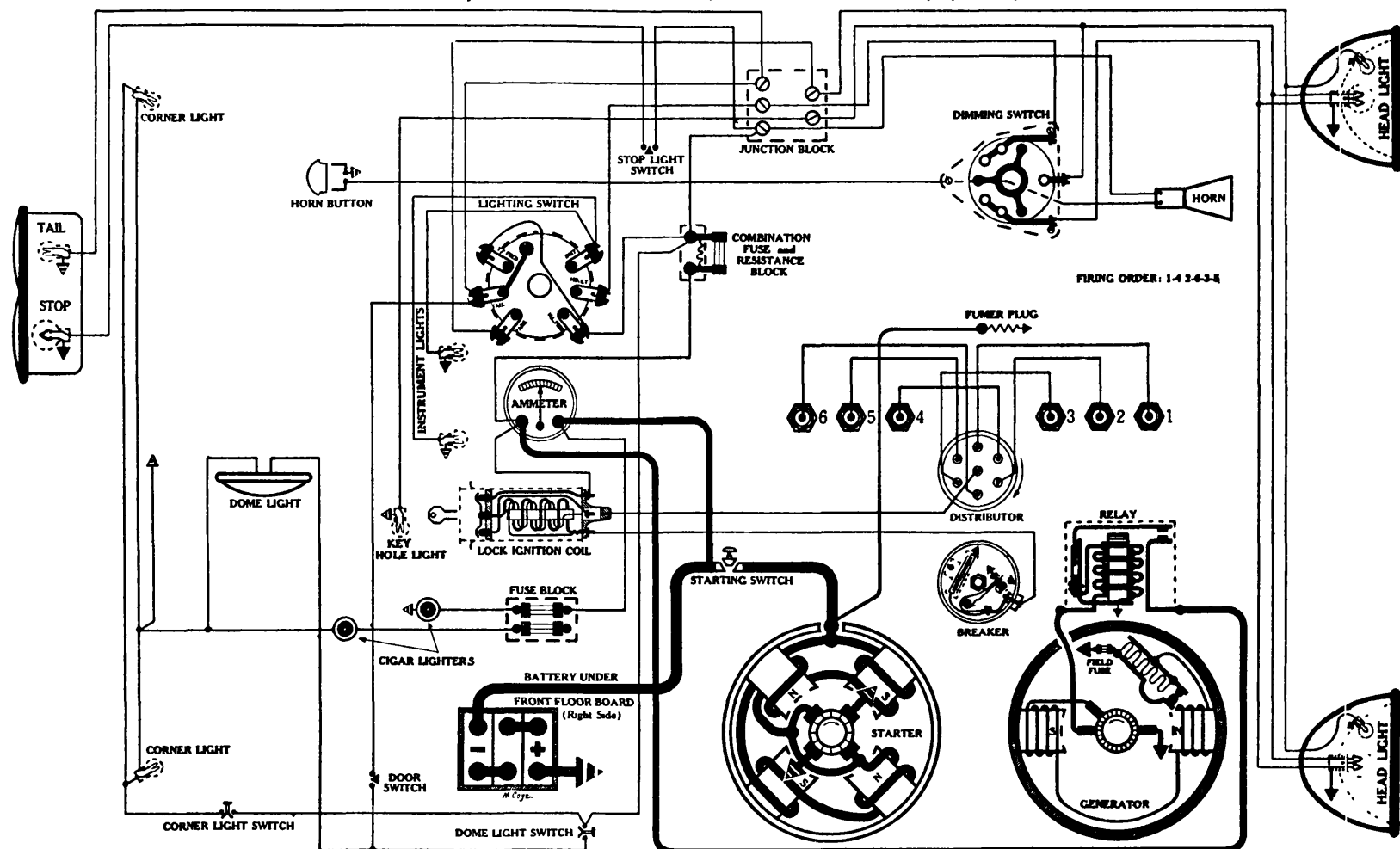
Motoring Freely—5 amps. at 6 volts.
Maximum Stall Current—18 to 22 amps. at 6 volts.
Field Test—5.2 amps. at 6 volts.
Brush Spring Tension—35 to 40 oz. on each.
Armature—Ford, 10005-C.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

Closes—7-7½ volts.
Opens—0-2.5 amps. discharge.
Contact Gap—.015-.020 inch.
Core Gap—.010 inch, contacts closed.

Switch—Ford No. A-11654-B.
Location—Foot of steering column. Lights controlled by lever on steering wheel. Wires soldered to terminals.
Fuses—None.
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX.—63;
STOP—1129; TAIL—63.

FRANKLIN

Series 15, Models 151 and 152, "Transcontinental", (1931)

**BATTERY**

U. S. L., XY-19-6, 6 volts. Positive Terminal Grounded.
Starting Capacity—153 amps. for 20 minutes.
Lighting Capacity—5 amps. for 28 hours.
Box—Length, 13 3/16; width, 7; height, 9 1/4 inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 723-C

Connection to Engine—Bendix Drive.

NOTE:—Gear reduction job. Pinion cut on armature shaft drives pinion on Bendix shaft.

Running Free—70 amps. at 5 volts, 3500 R.P.M.

Cranking Engine—160 to 170 amps. at 4.6 volts.

Lock Torque—22 pound-feet, 600 amps., 3 volts

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 408-A.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 642-P

Breaker—Contact separation .022 inch.

Contact Spring Tension—18 to 20 oz.

Timing—IMPORTANT! Time ignition in full advance position. Remove engine air housing over fan, that position of flywheel marks may be observed. No. 1 piston is in firing position when "O" mark on fan wheel is 1 inch to the right (generator side) of the mark found inside of fan housing, if piston is on compression stroke. When fan is in this position breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 101 and rod No. 4. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .027 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (Champion, No. 9); Gap .025 inch.

Firing Order—1-4-2-6-3-5.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—31 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Degrees Advance Dist. R.P.M.	Degrees Advance (on cam)
400	0	200	0
800	6	400	3
1200	12	600	6
1700	20	850	10
2200	28	1100	14
2400	31	1200	15 1/2

Lock Ignition Coil—Delco-Remy, 532-C.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 957-E

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	14	1400	7.9
5	800	7.1	16	1600 (Max.)	8.
9	1000	7.5	15	1800	8.
12	1200	7.8			

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—15 to 17 amps. at 6 volts.

Field Test—3 amps. at 6 volts across field coils in series.

Field Fuse—6 amps. (type 7A-6).

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 828292.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Franklin, No. 43400 (made by F. C. Hersey Co.).

Location—Mounted behind instrument board.

Dimming Switch—Delco-Remy, 486-J or 486-P.

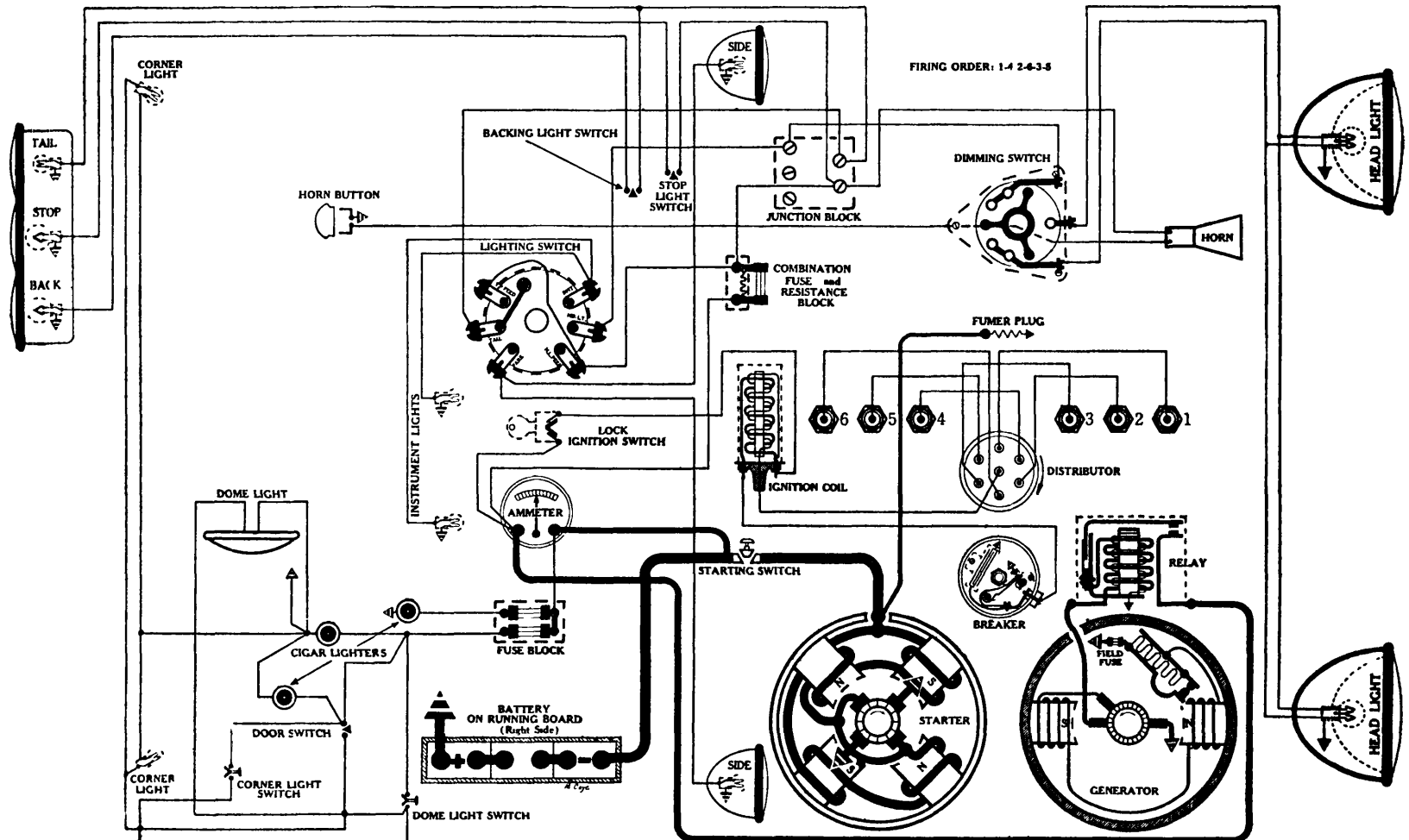
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—20 amp. fuse (type 5A-20) mounted on combination fuse block and resistance assembly. Two 20 amp. fuses (type 3A-20) on fuse block for cigar lighters.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; INSTRUMENT—63; CORNER—63; DOME—63; TAIL—63; STOP—1129.

FRANKLIN

S ries 15, Model 153, "D Lux ", (1931)



BATTERY

National, C3-19MR, 6 volts. Positive Terminal Grounded.
Starting Capacity—155 amps. for 20 minutes.
Lighting Capacity—5 amps. for 29 hours.
Box—Length, 20 1/4; width, 5 7/16; height, 8 3/4 inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 723-C

Connection to Engine—Bendix Drive.
NOTE:—Gear reduction job. Pinion cut on armature shaft drives pinion on Bendix shaft.
Running Free—70 amps. at 5 volts, 3500 R.P.M.
Cranking Engine—160 to 170 amps. at 4.6 volts.
Lock Torque—22 pound-feet, 600 amps., 3 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 408-A.
Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 642-P

Breaker—Contact separation .022 inch.
Contact Spring Tension—18 to 20 oz.
Timing—IMPORTANT! Time ignition in full advance position. Remove engine air housing over fan, that position of flywheel marks may be observed. No. 1 piston is in firing position when "O" mark on fan wheel is 1 inch to the right (generator side) of the mark found inside of fan housing, if piston is on compression stroke. When fan is in this position breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 4. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .027 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—Metric (Champion, No. 9); Gap .025 inch.
Firing Order—1-4-2-6-3-5.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—31 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	0	200	0
800	6	400	3
1200	12	600	6
1700	20	850	10
2200	28	1100	14
2400 (Max.)	31	1200	15 1/2

Coil—Delco-Remy, 528-C.
Ignition Switch—Clum, No. 9193.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 957-E

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts
0	575	6.5
5	800	7.1
9	1000	7.5
12	1200	7.8
14	1400	7.9
16	1600 (Max.)	8.
15	1800	8.

NOTE.—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—15 to 17 amps. at 6 volts.

Field Test—3 amps. at 6 volts across field coils in series.

Field Fuse—6 amps. (type 7A-6).

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 828292.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Franklin, No. 43400 (made by F. C. Hersey Co.).

Location—Mounted behind instrument board.

Dimming Switch—Delco-Remy, 486-J or 486-P.

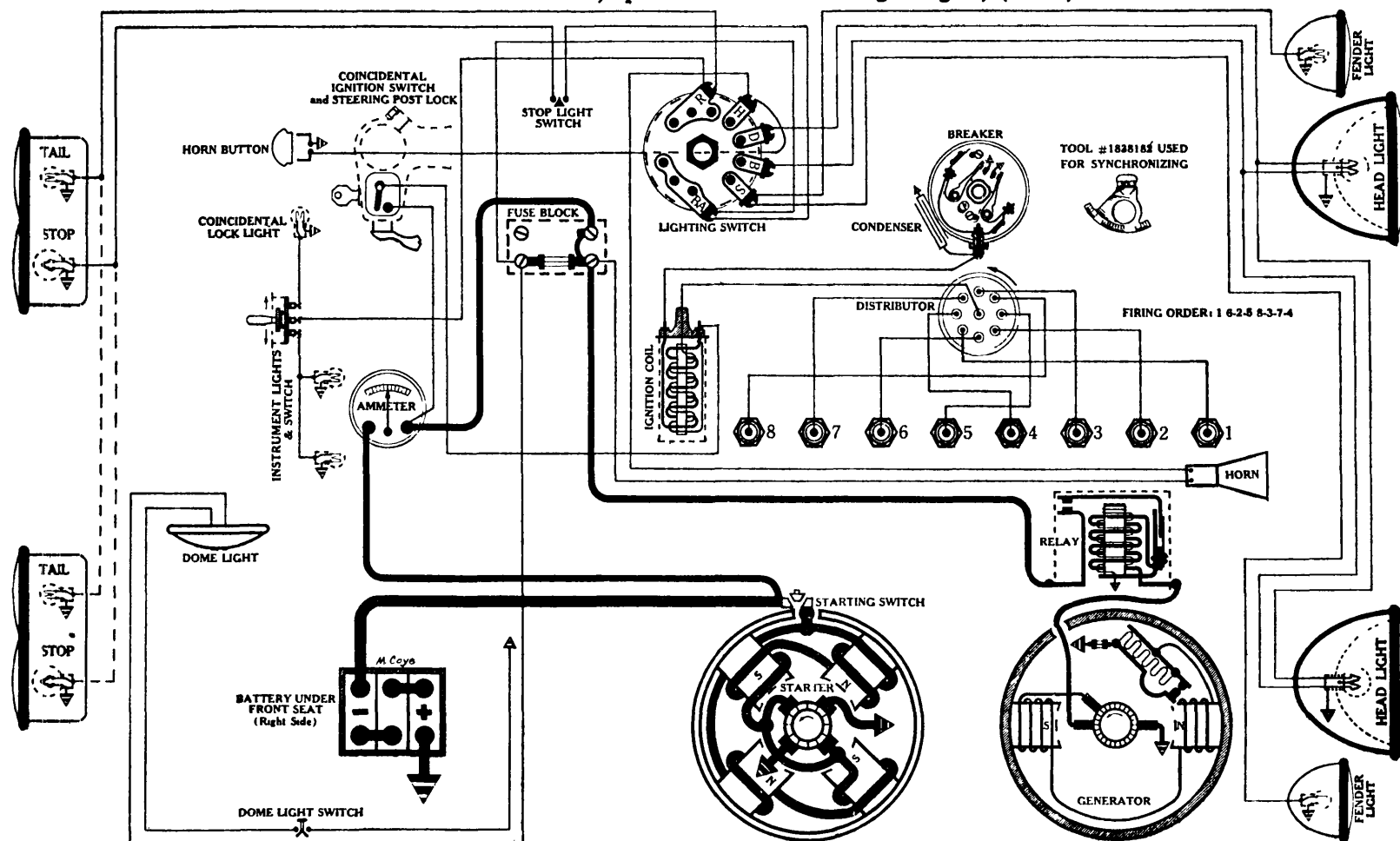
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—20 amp. fuse (type 5A-20) mounted on combination fuse block and resistance assembly. Two 20 amp. fuses (type 3A-20) on fuse block for cigar lighters.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; CORNER—63; DOME—63; TAIL—63; STOP—87; BACK—87.

GRAHAM

Models 8-20 and 8-34, Special and Custom Straight Eights, (1931)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded.
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7 1/16; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 725-K

Connection to Engine—Mechanical gear shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—165 to 185 amps. at 4.2 volts.
Lock Torque—16 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 820052.
Armature—Delco-Remy, 822187.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 660-C

Breakers—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke, bring flywheel mark "SF ADV-1" (spark fully advanced number 1 cylinder) opposite pointer on flywheel housing. With rotor opposite No. 1 Dist. Cap Terminal, stationary breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .011 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points just open.

Spark Plugs—3/8 inch (Champion type C-5); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—30 degrees (on Flywheel).
Automatic Advance—18 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0	300	0
1000	3	500	1 1/2
1400	7	700	3 1/2
1800	11	900	5 1/2
2200	14	1100	7
2600 (Max.)	18	1300	9

Coil—Delco-Remy, 528-C.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 957-B

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts
0	575	6.5
3	700	7.
6	800	7.1
11	1000	7.9
15	1200	8.1
20	1450 (Max.)	8.3
19	1700	8.3

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.
Max. Stall Current—18 to 20 amps. at 6 volts.
Field Test—4 3/4 to 5 1/2 amps. at 6 volts, across field coils in series.
Field Fuse—6 amps. (type 7A-6).
Brush Spring Tension—16 to 18 oz. on each.
Armature—Delco-Remy, 828892.
Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

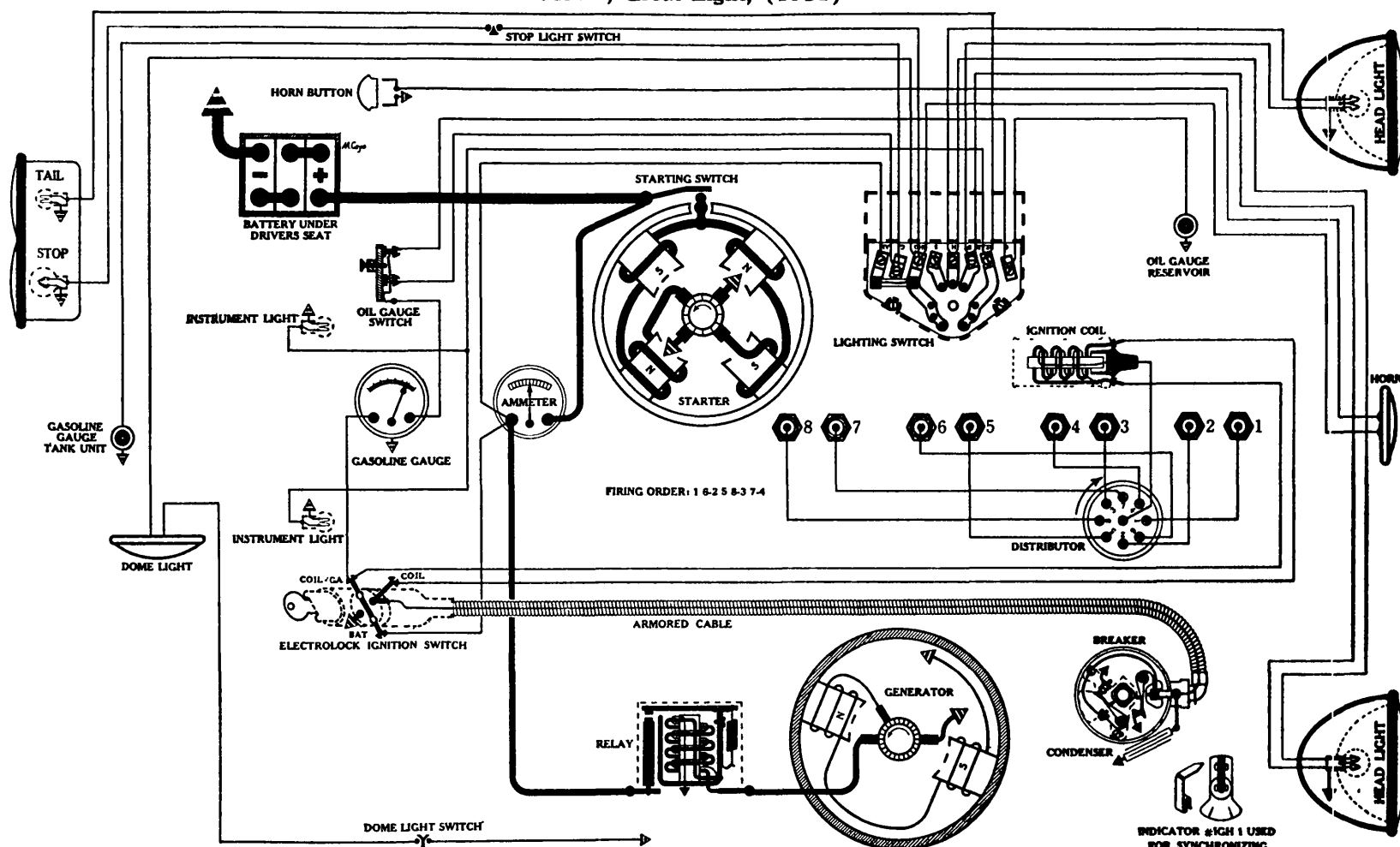
Closes—7 to 7 1/2 volts.
Opens—0 to 2 1/2 amps. discharge
Contact Gap—.015 to .025 inch.
Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton No. 50239.
Location—Foot of steering column. Lights controlled by lever on steering wheel.
Fuse—Single 20 amp. fuse (type 3A-20) mounted on dash (driver's side).
NOTE:—Two Stop and Tail Lights on Model 8-30, Custom Eights, only.
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

HUDSON

Model, Great Eight, (1931)



BATTERY

Exide, 3-VXA-13-1, 6 volts. Negative Terminal Grounded.
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—5 amps. for 16½ hours.
Box—Length, 9 1/16; width, 7; height, 9 3/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4034

Connection to Engine—Bendix Drive.
Running Free—60 amps. at 6 volts, 4150 R.P.M.
Cranking Engine—160 to 170 amps. at 4.3 volts.
Lock Torque—17 pound-feet, 520 amps. at 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Auto-Lite, MU-2208-S, mounted on starter. Operated by pull cable from instrument board.
Armature—Auto-Lite, MAB-2094.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGH-4009-A
(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch.
Contact Spring Tension—17 to 19 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing—With No. 1 piston on T.D.C., power stroke, flywheel mark "UDC 1-8" opposite pointer, rotor button opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—Metric (AC Type G-10); Gap .022 inch.
Firing Order—1-6-2-5-8-3-7-4.
Automatic Spark Advance—25 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	0	400	0
1800	8	900	4
2600	14	1300	7
3600	22	1800	11
4000 (Max.)	25	2000	12½

Coil—Auto-Lite, CE-4015.

Switch—"Electrolock," type 9-B. For details of operation and instructions on servicing see P. 22, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAM-4302

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0	550	6.5
2	600	6.9
5	650	7.1
10	800	7.8
14	950	7.9
16	1100	8.
17	1350 (Max.)	8.

Motoring Freely—4½ to 5½ amps. at 6 volts.
Max. Stall Current—18 to 19 amps. at 6 volts.
Field Test—4½ amps. at 6 volts across field coils in series.
Brush Spring Tension—20 to 24 oz. on main; 30 to 34 oz. on third.
Armature—Auto-Lite, GAM-2038.
Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

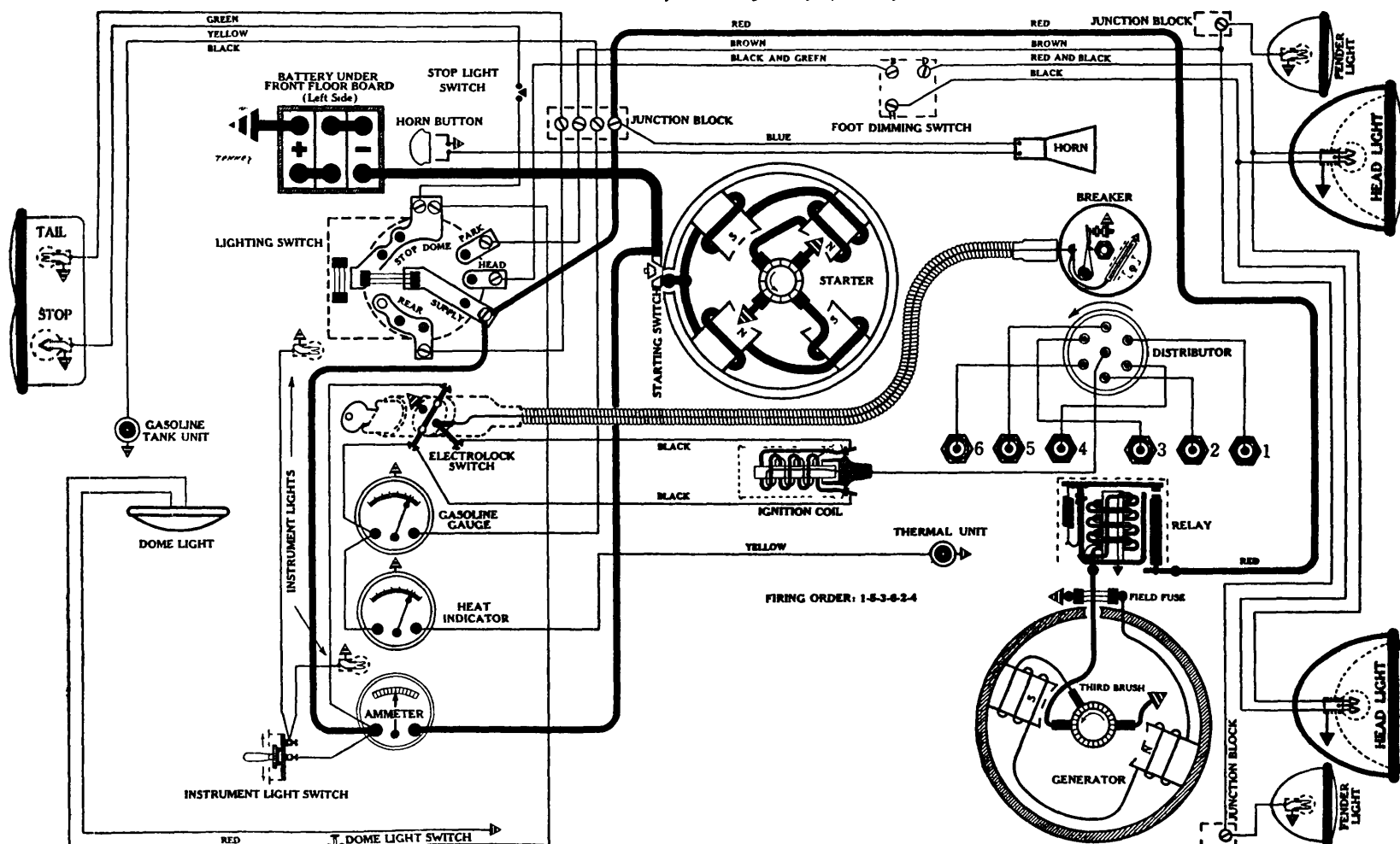
Auto-Lite, CB-4016

Closes—7 to 7½ volts.
Opens—½ to 2½ amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, Nos. 8050-A or 8074-B
Location—On frame under engine hood (left side). Lights controlled by lever on steering wheel.
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch face, under cover.
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; TAIL—63; INSTRUMENT—63; DOME—63; STOP—87.

Model S-2, Century Six, (1931)



Willard, WS-2-15, 6 volts. Positive Terminal Grounded.

Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7 1/16; height, 8 3/4 inches.

Rotation, L. H., Com. End
Auto-Lite. MAJ-4003

Connection to Engine—Bendix Drive.
Running Free—50 amps. at 5.5 volts.
Cranking Engine—160 amps. at 4.2 volts, 228 R.P.M.
Lock Torque—12½ pound-feet, 575 amps., 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Auto-Lite, MU-2208-S, mounted on starter. Operated by pull cable from instrument board. Tension on switch should not close with less than 7½ lbs. pull applied at right angles to hole in extreme end of lever.
Armature—Auto-Lite, MAJ-2048.

Rotation, L. H., Top View
Auto-Lite, IGC-4046

Breaker—Contact separation .020 inch.
Contact Spring Tension—17 to 19 oz.
Timing—With No. 1 piston on T.D.C., power stroke flywheel mark “DC-1-6” opposite indicator, spark fully retarded, rotor opposite No. 1 Dist. Cap Terminal; breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when piston is .018 inch before T.D.C., as indicated on Gauge. With spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—Metric (Champion No. 10); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Manual Advance—30 degrees (on Flywheel).
Automatic Advance—16 degrees (on Flywheel).

Eng. R P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
1000	0	500	0
1600	4	800	2
2600	8	1300	4
3600 (Max.)	16	1800	8

Coil—Auto-Lite, IG-4080.

Ignition Switch—"Electrolock," type 9-B. For details of operation and instructions on servicing, see P. 22, Sec. AA.

Rotation, L. H., Com. End
Auto-Lite, GAL-4324

Performance Data—Gen. cold.

Amps.	R P.M.	Volts	Amps.	R.P.M.	Volts
0	650	6.5	10	1075	7.3
2	720	6.6	14	1340	7.7
5	850	7.	16	1800 (Max.)	8.

Motoring Freely— $4\frac{1}{2}$ to 5 amps. at 6 volts.
 Max. Stall Current—16 to 19 amps. at 6 volts.
 Field Test— $4\frac{1}{2}$ amps. at 6 volts across field coils in series.
 Field Fuse— $7\frac{1}{2}$ amps. (type 1A- $7\frac{1}{2}$).
 Brush Spring Tension—10 to 13 oz. on each.
 Armature—Auto-Lite, GAL-2121.
 Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7,
 Sec. AA.

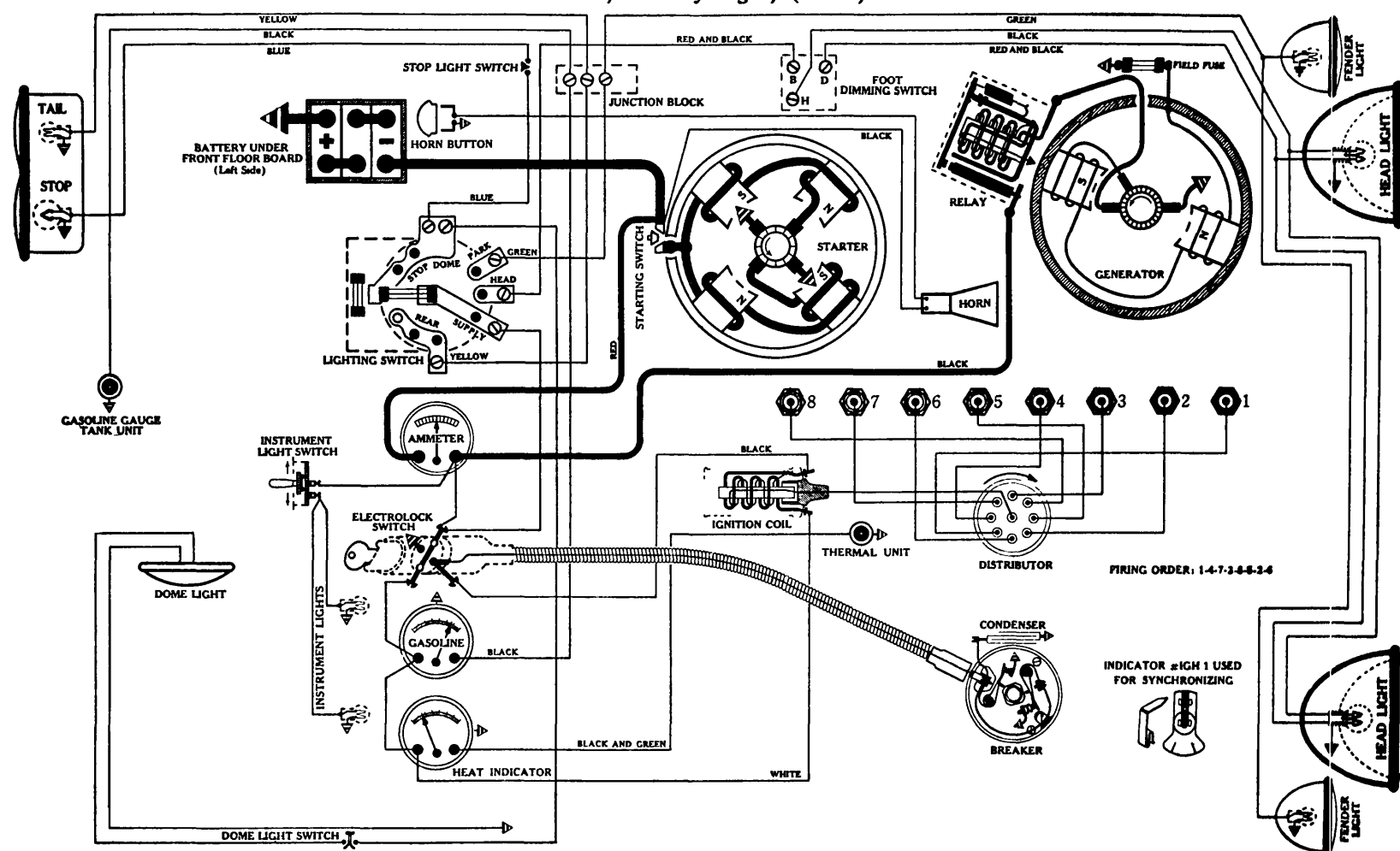
Auto-Lite, CB-4014

Closes—7 to 7½ volts.
Opens—½ to 2½ amps. discharge.
Contact Gap—.025 to .035 inch
Core Gap—.010 to .012 inch, contacts closed.

Switch—Briggs & Stratton, No. 40956.
Location—Behind instrument board. Operated by pull knob.
Foot Dimming Switch—Clum, No. 9197.
Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.
Fuses—Single 20 amp. fuse (type 3A-20), with spare, mounted on switch back.
Lamps—See P. 3, Sec. AA. **HEAD**—1110 (Bifocal); **FENDER**—63; **INSTRUMENT**—63; **DOVE**—63; **STOP**—87; **TAIL**—63.

HUPMOBILE

Model L, Century Eight, (1931)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded.
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours
Box—Length, 10 5/16; width, 7 1/16; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAD-4113

Connection to Engine—Bendix Drive.
Running Free—60 amps. at 5.5 volts, 3750 R.P.M.
Cranking Engine—165 to 175 amps. at 4.1 volts.
Lock Torque—13 pound-feet, 505 amps., 3 volts.
Brush Spring Tension—40 to 48 oz. on each.
Starting Switch—Auto-Lite, MU-2208-S, mounted on starter.
Switch should not close with less than 7 1/2 lbs. pull applied at right angles to hole in extreme end of lever.
Armature—Auto-Lite, MAD-2083.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGH-4008-C

Breakers—Contact separation .020 inch.
Contact Spring Tension—17 to 19 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing—With No. 1 piston on compression stroke, spark fully advanced, bring flywheel mark found 2 1/4 inches ahead of "1-8-DC" opposite pointer, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .140 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—Metric (Champion No. 8); Gap .025 inch.
Firing Order—1-4-7-3-8-5-2-6.
Manual Advance—38 degrees (on Flywheel).
Automatic Advance—16 degrees (on Flywheel).
Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance
(on flywheel) (on cam)

800	0	400	0
1000	5	500	-2 1/2
2400	9	1200	-4 1/2
3200	14	1600	7
3600 (Max.)	16	1800	8

Coil—Auto-Lite, CE-4014.

Ignition Switch—"Electrolock," type 9-B. For theory of operation and instructions on servicing, see P. 22, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4338, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0	650	6.5
2	720	6.6
5	850	7.
10	1075	7.3
14	1340	7.7
16	1800 (Max.)	8.

Motoring Freely—4 1/2 to 5 amps. at 6 volts.
Max. Stall Current—16 to 19 amps. at 6 volts.
Field Test—4 1/2 amps. at 6 volts across field coils in series.
Field Fuse—7 1/2 amps. (type 1A-7 1/2).
Brush Spring Tension—10 to 13 oz. on each.
Armature—Auto-Lite, GAL-2181.
Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4011

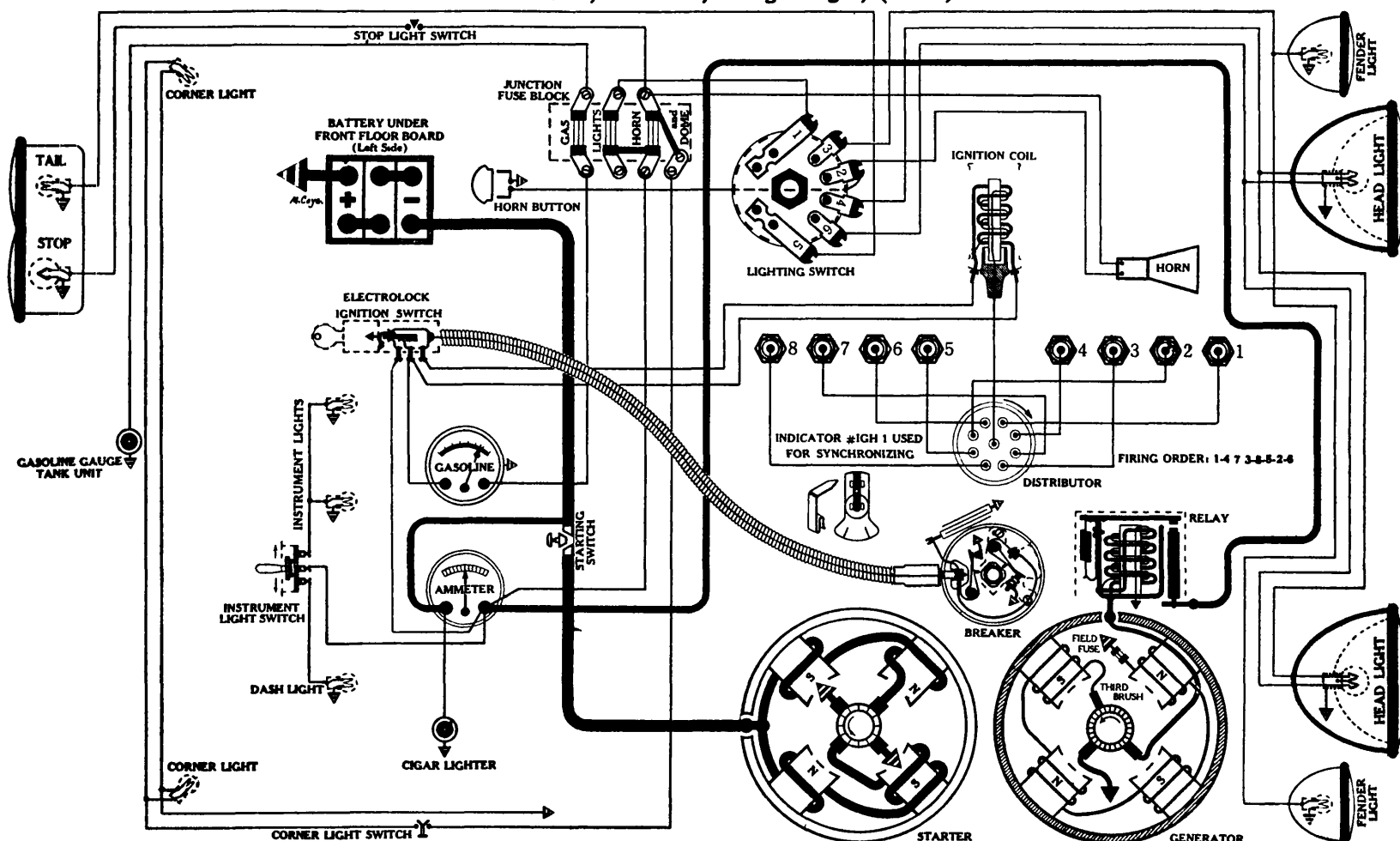
Closes—7 to 7 1/2 volts.
Opens—1/2 to 2 1/2 amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton, No. 40956.
Location—Behind instrument board. Operated by pull knob.
Foot Dimming Switch—Clum, No. 9197.
Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.
Fuses—Single 20 amp. fuse (type 3A-20), with spare, mounted on switch back.
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

HUPMOBILE

Model C, 100 H.P., Straight Eight, (1931)



BATTERY

Willard, WJ-2-13, 6 volts. Positive Terminal Grounded.
Starting Capacity—125 amps. for 20 minutes.
Lighting Capacity—5 amps. for 22 hours.
Box—Length, 10 5/16; width, 7 1/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4021

Connection to Engine—Bendix Drive.
Running Free—60 amps. at 6 volts, 4150 R.P.M.
Cranking Engine—160 to 170 amps. at 4 volts.
Lock Torque—17 pound-feet, 520 amps. at 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Auto-Lite, SW-4002.
Armature—Auto-Lite, MAB-2046.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGH-4008-C

Breakers—Contact separation .020 inch.
Contact Spring Tension—17 to 19 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing—With No. 1 piston on compression stroke, spark fully advanced, bring flywheel mark found 1 inch ahead of "1-8-DC" opposite pointer, rotor opposite No. 1 Dist. Cap Terminal; stationary set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .029 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—Metric (Champion No. 8); Gap .025 inch.
Firing Order—1-4-7-3-8-5-2-6.
Manual Advance—38 degrees (on Flywheel).
Automatic Advance—16 degrees (on Flywheel).
Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance (on flywheel) (on cam)

800	-	0	400	-	0
1000	-	5	500	-	2 1/2
2400	-	9	1200	-	4 1/2
3200	-	14	1600	-	7
3600 (Max.)	-	16	1800	-	8

Coil—Auto-Lite, CE-4001.

Ignition Switch—"Electrolock," type 5-B. For theory of operation and instructions on servicing see P. 18, Sec. AA.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAG-4118

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	525	6.5	10	780	7.3
2	550	6.6	14	1200	7.7
5	650	7.	17	1250 (Max.)	8.

Motoring Freely—4 1/2 to 5 amps. at 6 volts.

Max. Stall Current—17 to 19 amps. at 6 volts.

Field Test—4 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps. (type 1A-7 1/2).

Brush Spring Tension—22 to 27 oz. on each.

Armature—Auto-Lite, GAG-2099.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4012

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 6050-A.

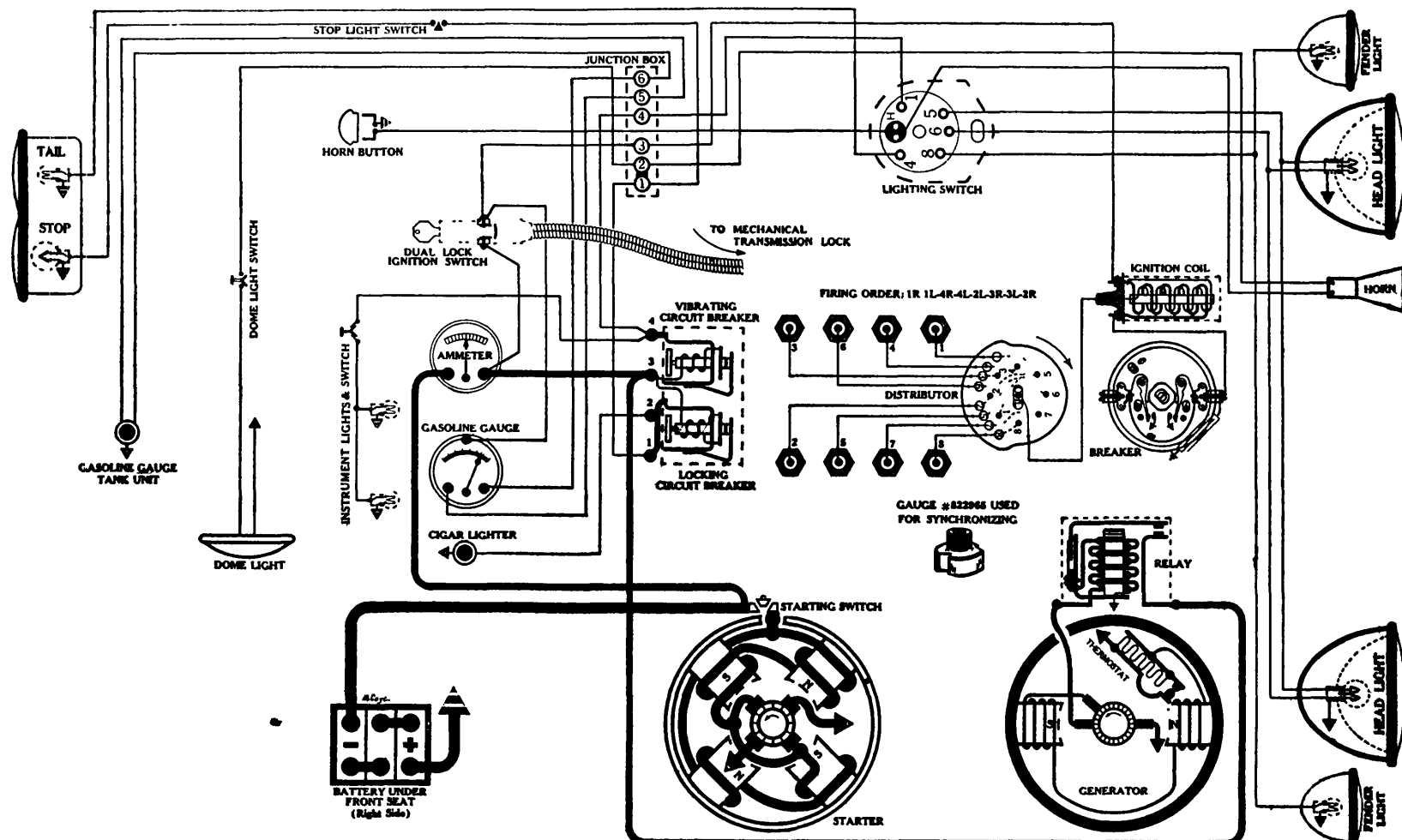
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two 10 amp fuses (type 3A-10), with spare, in box under hood (left side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; CORNER—63; STOP—87; TAIL—63.

LA SALLE

Model 345-A, "V8", (1931)



BATTERY

Delco-Remy, 15-C, 6 volts. Positive Terminal Grounded.

Starting Capacity—137 amps. for 20 minutes.

Lighting Capacity—5 amps. for 23½ hours.

Box—Length, 10 9/32; width, 7; height, 9 5/8 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 728-D

Connection to Engine—Mechanical Gear Shift, incorporating an overrunning clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter. Gear reduction job.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—245 to 260 amps. at 4 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 16210.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 4055

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.

Timing—With No. 1L piston on compression stroke, flywheel mark "IG-A" opposite indicator, spark lever full advance in "starting range," rotor opposite No. 1 Dist. Cap Terminal; stationary breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1L piston is coming up on compression stroke. Stop when .025 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Firing Order—1R-1L-4R-4L-2L-3R-3L-2R.

Spark Plugs—Metric (AC Type G-10); Gap .025 inch.

Manual Advance—40 degrees (on Flywheel).

Automatic Advance—30 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
1000	0-2	500	0-1
1500	6-8	750	3-4
2500	14-16	1250	7-8
3000	22-24	1500	11-12
3800 (Max.)	28-30	1900	14-15

Coil—Delco-Remy, 530-J.

Ignition Switch—Delco-Remy, 426-M, "Dual Lock." (Combination Ignition Switch and Mechanical Transmission Lock.)

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 927-D

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts
0	575	6.5
3	700	7.
6	800	7.1
11	1000	7.9
15	1200	8.1
20	1450 (Max.)	8.3

NOTE.—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—3½ to 4 amps at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—2.1 amps. at 6 volts, across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Armature—Delco-Remy, 18102.

Third Brush Adjustment—Loosen Cover Band. See Fig. 13, P. 7, Sec. AA.

RELAY

Delco-Remy, 266-N

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-H.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

Circuit Breaker—Delco-Remy, 5759.

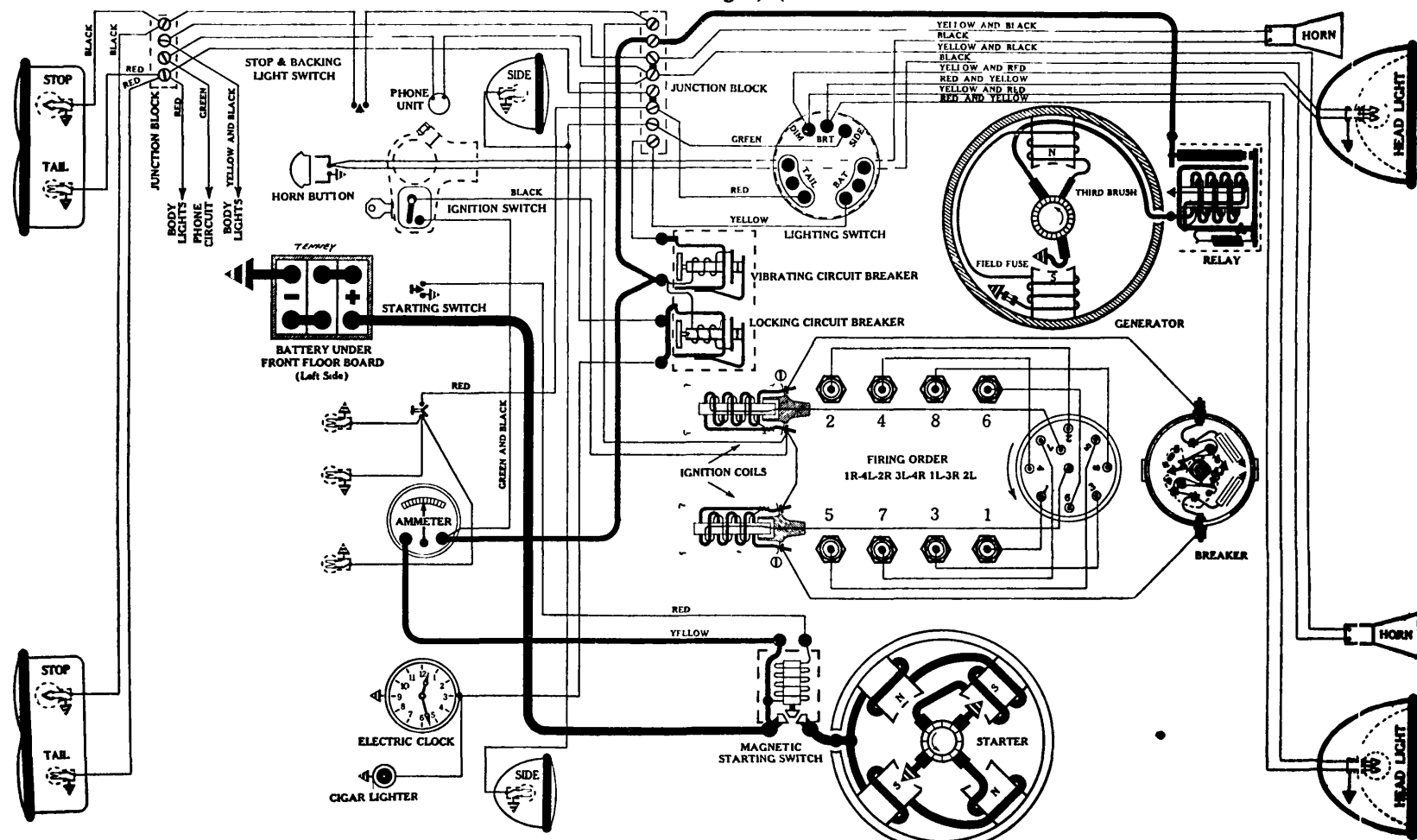
Vibrating—Starts 25 to 30 amps. Operates 10 to 15.

Lock-Out—Starts 25 to 30 amps. Operates with discharge less than 1 ampere.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; STOP—87; TAIL—63; INSTRUMENT—63.

LINCOLN

Model "Vee" Eight, (1931)



BATTERY

Exide, 3-LXV-15-1RD, 6 volts. Negative Terminal Grounded.
Starting Capacity—150 amps. for 20 minutes.
Lighting Capacity—5 amps. for 29 hours
Box—Length, 15½; width, 7; height, 8 11/16 inches

STARTER

Rotation, L. H., Com. End Auto-Lite, MAL-4001
Connection to Engine—Bendix Drive
Running Free—60 amps at 6 volts.
Cranking Engine—215 to 230 amps. at 4.1 volts.
Lock Torque—22 pound feet, 550 amps at 3 volts.
Brush Spring Tension—41 to 48 oz. on each.
Starting Switch—Eclipse Aviation Corp, type M-2583-A
Location—Mounted on starter Magnetic type switch, controlled by press button on instrument board.
Armature—Auto-Lite, MAL-2006

IGNITION

Rotation, L. H., Top View Auto-Lite, IGL-4001

Breakers—Contact separation .020 inch.
Contact Spring Tension—20 to 22 oz on each
Synchronizing—Movable points open 60 degrees after stationary. Unequal intervals of 60-30-60, etc degrees between interruptions. The stationary, or left hand set of breaker points, control the left hand ignition coil, which distributes thru the "off-center" high tension terminal on the distributor cap, and fires the left cylinder bank.

Timing—IMPORTANT! Time ignition in full advance position. Remove inspection cover on flywheel housing. Remove No 2 spark plug, and slowly hand crank engine until No. 2 piston is coming up on compression stroke. Stop when flywheel mark "A-2" is opposite pointer. In this position the left hand or stationary set of breaker points should just open. If the ignition cam is in the correct position, the "off-center" end of rotor will almost line up with the left hand primary terminal. The line on flywheel marked "A-1" is for setting the spark for the right block.

Timing with MOTOR GAUGE—Remove No. 2 spark plug, and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly hand crank engine until No. 2 piston is coming up on compression stroke. Stop when .019 inch before T.D.C., as indicated on Gauge. With spark in full advance position, "off-center" end of rotor opposite No. 2 Dist. Cap Terminal, the stationary set of breaker points should just open.

Spark Plugs—¾ inch (Champion, type C-4); Gap .028 inch.

Firing Order—1R-4L-2R-3L-4R-1L-3R-2L

NOTE—Cylinders on engine numbered as follows. From radiator back, Right Block—1-3-7-5 Left Block—6-8-4-2 High tension wires run from numbered terminals on Dist Cap to corresponding numbers on cylinder block

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—26 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	0	400	0
1200	4	600	2
1600	8	800	4
2000	12	1000	6
2800	21	1400	10½
3300 (Max)	26	1650	13

Ignition Coils—Auto-Lite, CE-4001.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAU-4001, (Belt Drive)

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	550	6.4	12½	1000	7.6
2½	600	6.6	15	1200	7.8
6	700	7.	16	1400	7.9
8½	800	7.2	17	1600 (Max.)	8.

Motoring Freely—3½ amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—2½ amps at 6 volts, across field coils in series.

Field Fuse—7½ amps. (type 1A-7½), mounted in commutator end frame

Brush Spring Tension—24 to 26 oz. on each.

Armature—Auto-Lite, GAU-2006

Third Brush Adjustment—Loosen cover band. Shift third brush by hand; mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014-L

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Special Lincoln design, made by Essex Wire Co.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

Circuit Breakers—Delco-Remy, 5778.

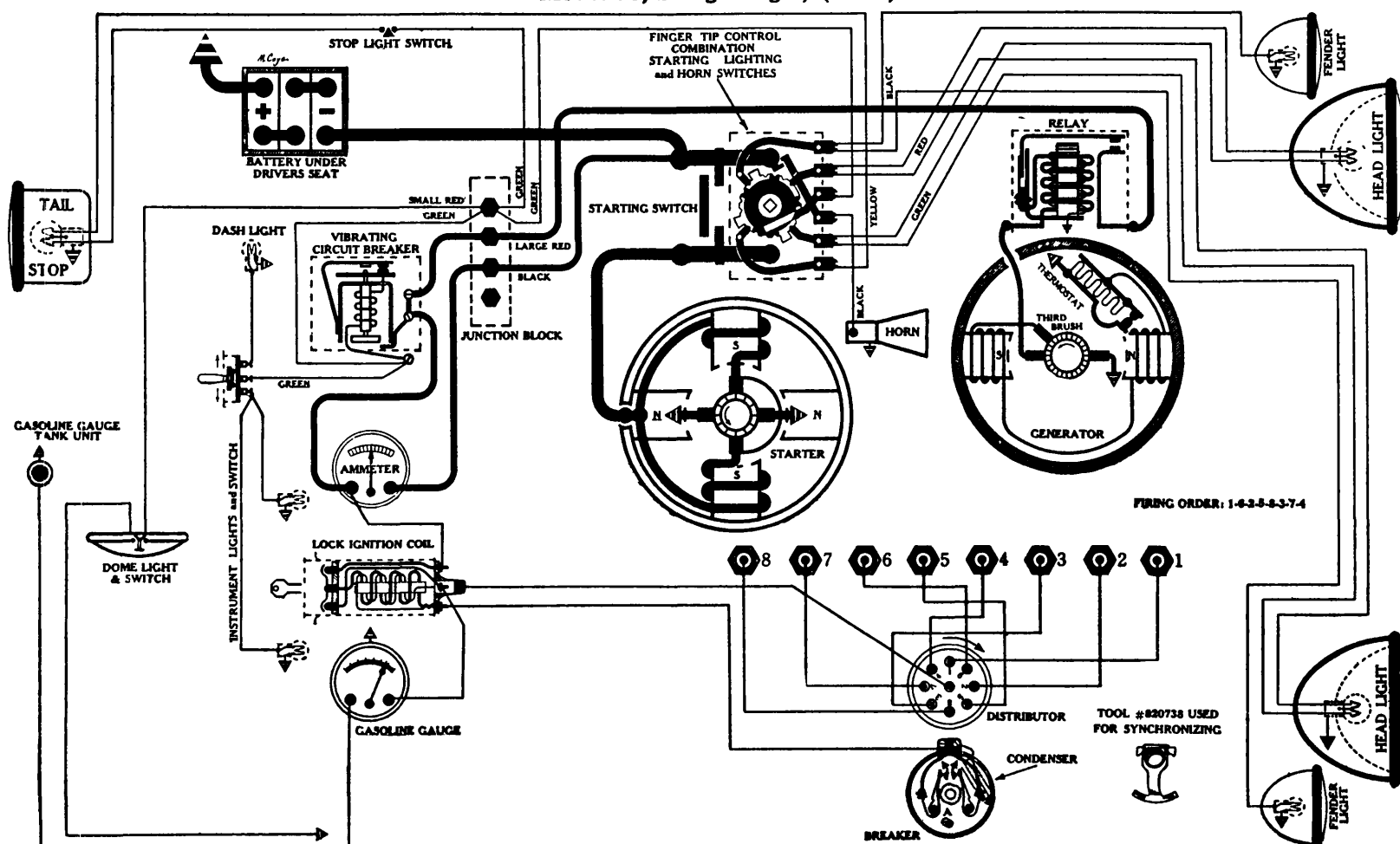
Vibrating—Starts 25 to 30 amps. Operates 10 to 15.

Lock-Out—Starts 25 to 30 amps. Operates with discharge less than 1 amp.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); SIDE—81, INSTRUMENT—63; TAIL—63; DOME—63; STOP AND BACK—87.

MARMON

Model 70, Straight Eight, (1931)



BATTERY

National, H3-15X, 6 volts. Positive Terminal Grounded.
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10½; width, 7¼; height, 9¼ inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-C

Connection to Engine—Bendix Drive.
Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—175 to 180 amps. at 4.5 volts.
Lock Torque—12 pound-feet, 475 amps., 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Located foot of steering column. Operated by pulling up on horn button.
Armature—Delco-Remy, 818002.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 652-D

Breakers—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing—With No. 1 piston on compression stroke, first bring flywheel mark "T.D.C. 1 & 8" opposite pointer. Turn flywheel back a distance of two teeth. With spark fully retarded, rotor opposite No. 1 Dist. Cap Terminal, stationary breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .018 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (Champion No. 8); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
900	0	450	0
1200	3	600	1½
1800	8	900	4
2400	14	1200	7
2800	17	1400	8½
3100 (Max.)	20	1550	10

Lock Ignition Coil—Delco-Remy, 526-P.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 949-X (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4½ to 5 amps. at 6 volts, across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 817807.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Pines Finger Tip Control, No. 312 (Square type, as shown). NOTE:—Very late 1931 cars equipped with round type Switch, No. A-308.

Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.

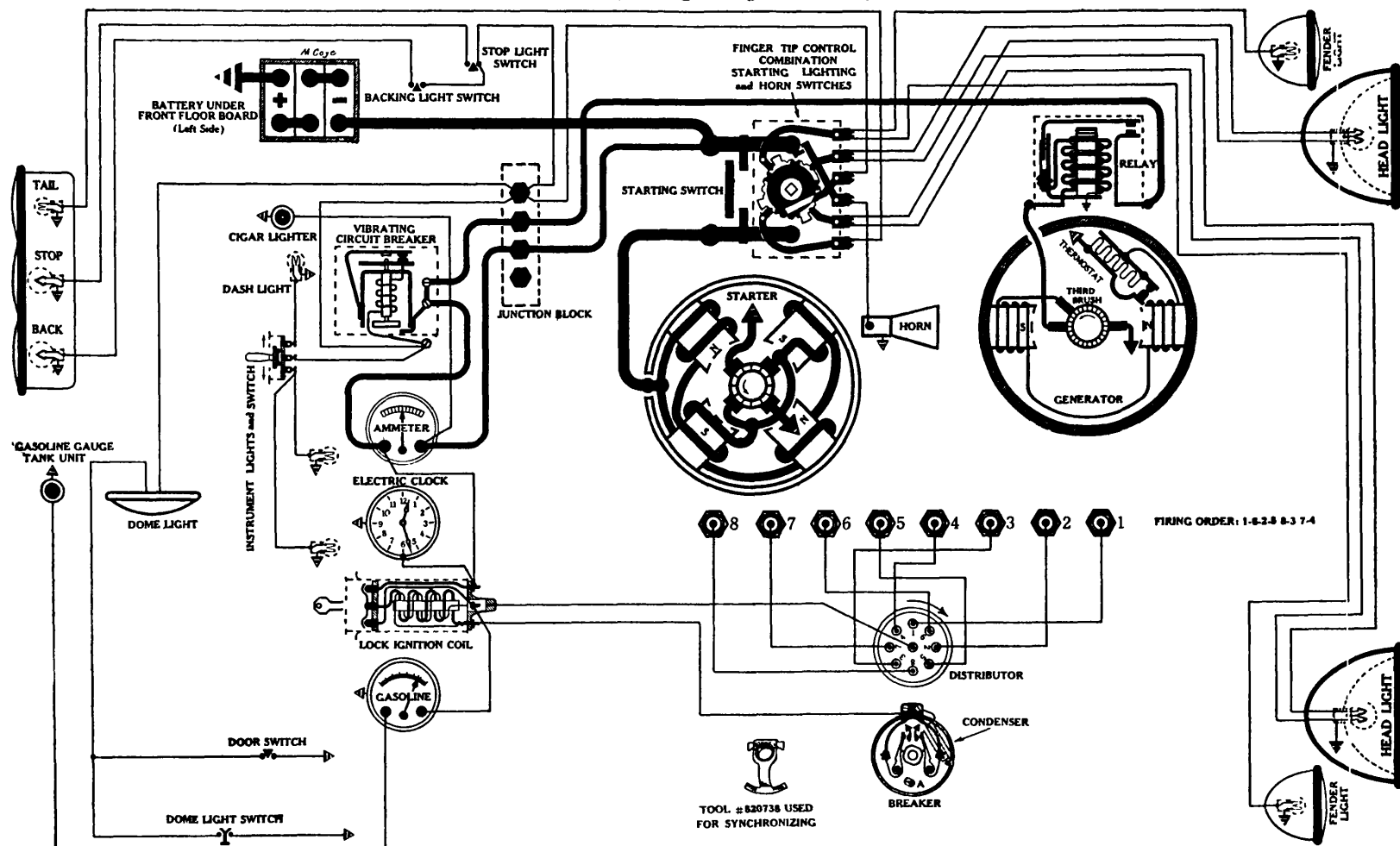
Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—64; STOP AND TAIL—1158.

NOTE:—This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

MARMON

Model 88, Straight Eight, (1931)



BATTERY

Exide, 3-MXC-19-1, 6 volts. Positive Terminal Grounded.
Starting Capacity—171 amps. for 20 minutes.
Lighting Capacity—5 amps. for 31 hours.
Box—Length, 13 3/16; width, 7; height, 9 13/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 718-M

Connection to Engine—Bendix Drive.
Running Free—65 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—160 to 175 amps. at 4.3 volts.
Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Located foot of steering column. Operated by pulling up on horn button.
Armature—Delco-Remy, 818002.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 652-D

Breakers—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz. on each
Synchronizing—Movable points open 45 degrees after stationary.
Timing—With No. 1 piston on compression stroke, first bring flywheel mark "T.D.C. 1 & 8" opposite pointer. Turn flywheel back a distance of two teeth. With spark fully retarded, rotor opposite No. 1 Dist. Cap Terminal, stationary breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .010 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (Champion No. 8); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
900	0	450	0
1200	3	600	1 1/2
1800	8	900	4
2400	14	1200	7
2800	17	1400	8 1/2
3100 (Max.)	20	1550	10

Lock Ignition Coil—Delco-Remy, 526-P.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine. Coil has three "primary" terminals marked "Bat," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 949-F (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.					
Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 1/4 to 5 amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 820370.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Pines Finger Tip Control, No. 312 (Square type, as shown).

NOTE:—Very late 1931 cars equipped with round type Switch, No. A-808.

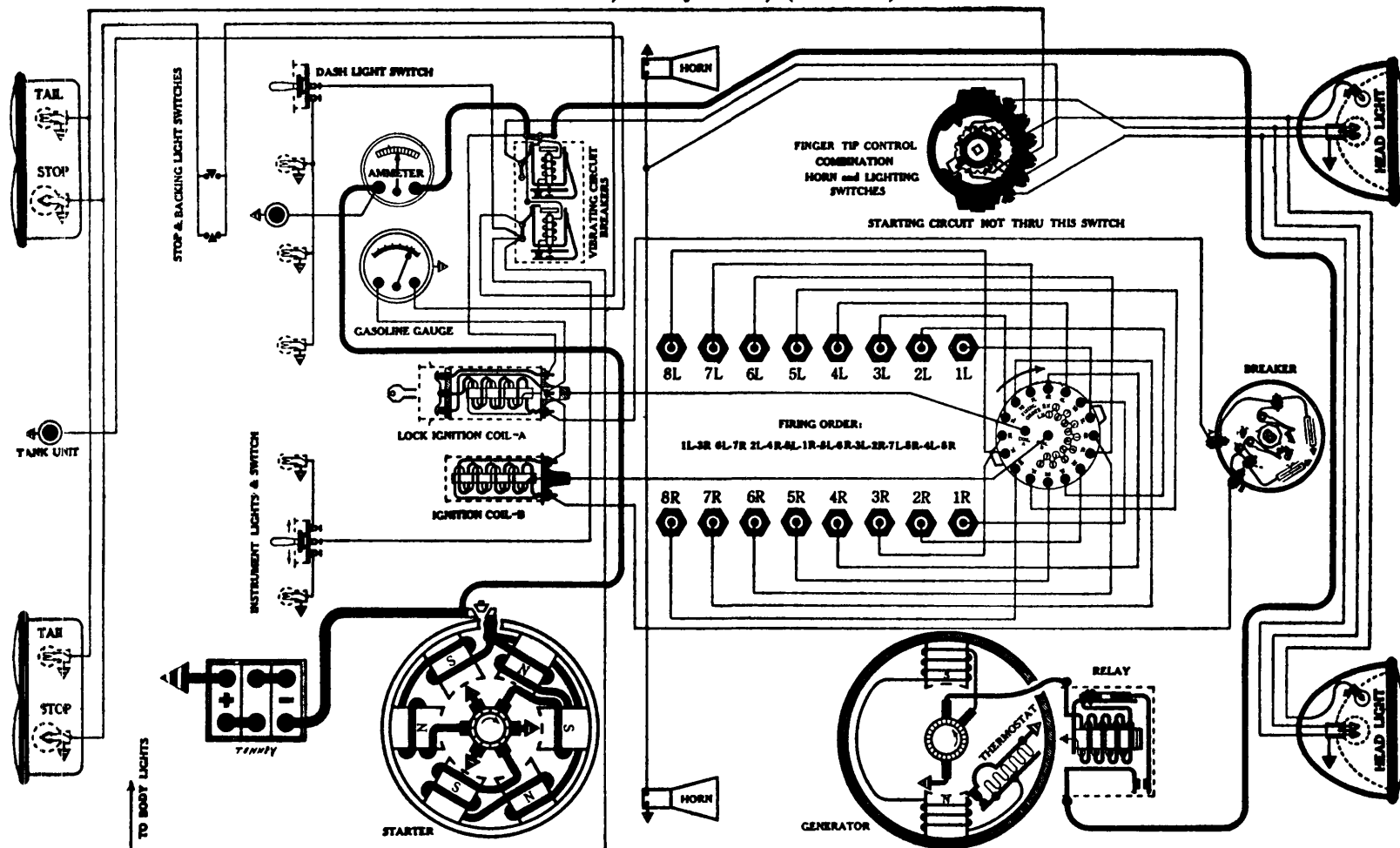
Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; CORNER—64; DOME—64; STOP—87, BACK—87; TAIL—63.

MARMON

Mod 1, 16 Cylind r, (1931-33)



BATTERY

Exide, 3-XCH-21-1, 6 volts. Positive Terminal Grounded.

Starting Capacity—190 amps. for 20 minutes.

Lighting Capacity—5 amps. for 36 hours.

Box—Length, 13 9/16; width, 7; height, 9 5/16 inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 489

Connection to Engine—Mechanical Gear Shift, incorporating an overrunning clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter.

Running Free—70 amps. at 5 volts, 3000 R.P.M.

Cranking Engine—235 to 250 amps. at 4 volts.

Lock Torque—19 pound-feet, 500 amps. at 3 volts.

Brush Spring Tension—36 to 40 oz. on each.

Armature—Delco-Remy, 1841076.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 4084

Breakers—Contact separation .015 inch.

NOTE:—Due to the peculiar design of the ignition cam, to insure good high speed performance the contact separation must be accurately adjusted to .015 inch and no more.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 22½ degrees after stationary. Equal 22½ degrees intervals between interruptions.

Timing—IMPORTANT! Time ignition in full advance position. Slowly turn engine until No. 1L piston is coming up on compression stroke. Stop when flywheel mark "IGNITION" is directly in line with pointer at flywheel inspection hole. With rotor under No. 1L Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1L spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1L piston is coming up on compression stroke. Stop when 033 inch before T.D.C. as indicated on Gauge. With spark in full advance position, rotor opposite No. 1L Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (Champion No. 8); Gap .025 inch.

Firing Order—1L-3R-6L-7R-2L-4R-5L-1R-8L-6R-3L-2R-7L-5R-4L-8R.

NOTE:—Both cylinder banks are numbered 1-2-3, etc., right and left, starting from radiator.

Automatic Advance—32 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0	300	0
1000	4	500	2
1800	12	900	6
2600	20	1300	10
3400	28	1700	14
3800 (Max.)	32	1900	16

Lock Ignition Coil—Delco-Remy, 533-S.

Ignition Coil—Delco-Remy, 528-A.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-N

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts
0	575	6.5
3	700	7.
6	800	7.1
11	1000	7.9
15	1200	8.1
20	1450 (Max.)	8.3

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—3½ to 4 amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—2.1 amps. at 6 volts, across field coils in series.

Brush Spring Tension—16 to 20 oz. on each.

Armature—Delco-Remy, 1841045.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 266-E

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Pines Finger Tip Control, No. A-808.

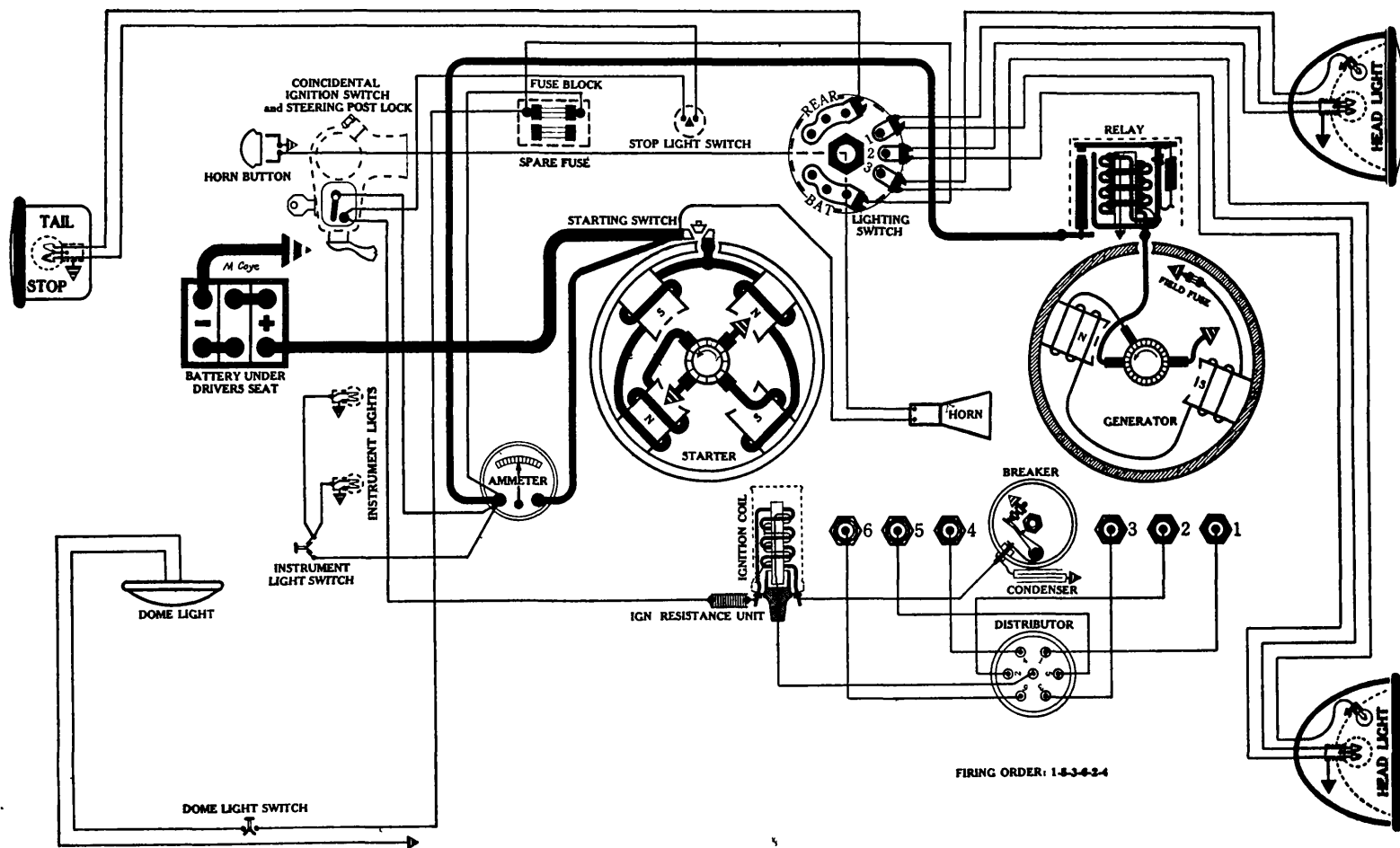
Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel. On this car the starting circuit is not thru the Finger Tip Control Switch.

Vibrating Circuit Breakers—Delco-Remy, 410-E. Starts 25 to 30 amps. Operates 2 to 15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; INSTRUMENT—63; CORNER—64; DOME—64; STOP—87; BACK—87; TAIL—63.

NASH

Model Six-60, Series 660, Single Ignition Six, (1931)



BATTERY

U. S. L., 3-HVX-5X-7A, 6 volts. Negative Terminal Grounded.
Starting Capacity—106 amps. for 20 minutes.
Lighting Capacity—5 amps. for 18 hours.
Box—Length, 9 1/16; width, 7 7/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4026

Connection to Engine—Bendix Drive.

Running Free—46 amps. at 5.5 volts, 4020 R.P.M.

Cranking Engine—160 to 170 amps. at 4.3 volts.

Lock Torque—17 pound-feet, 520 amps. at 3 volts.

Brush Spring Tension—44 to 48 oz. on each.

Starting Switch—Auto-Lite, MAB-3080, mounted on starter. Switch should not close with less than 4 lbs. pull applied at right angles to hole in extreme end of lever.

Armature—Auto-Lite, MAB-2057.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGB-4015

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Contact Spring Tension—17 to 19 oz.

Timing—With No. 1 piston on compression stroke, notch cut in flywheel opposite pointer, rotor opposite No. 1 Dist. Cap Terminal; breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .008 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (AC type G-14); Gap .020 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—28 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0	300	0
1200	6	600	3
1800	12	900	6
2400	18	1200	9
3000	24	1500	12
3400 (Max.)	28	1700	14

Coil—Auto-Lite, IG-4065.

Ignition Resistance Unit—Auto-Lite, IGB-2145.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAL-4329, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0	600	6.3
6	800	6.9
10	1000	7.1
13	1200	7.5
15	1400	7.7
17	1900 (Max.)	8.

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—4 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps. (type 1A-7 1/2).

Brush Spring Tension—10 to 13 oz. on each.

Armature—Auto-Lite, GAL-2006.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold No. 4210-A.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

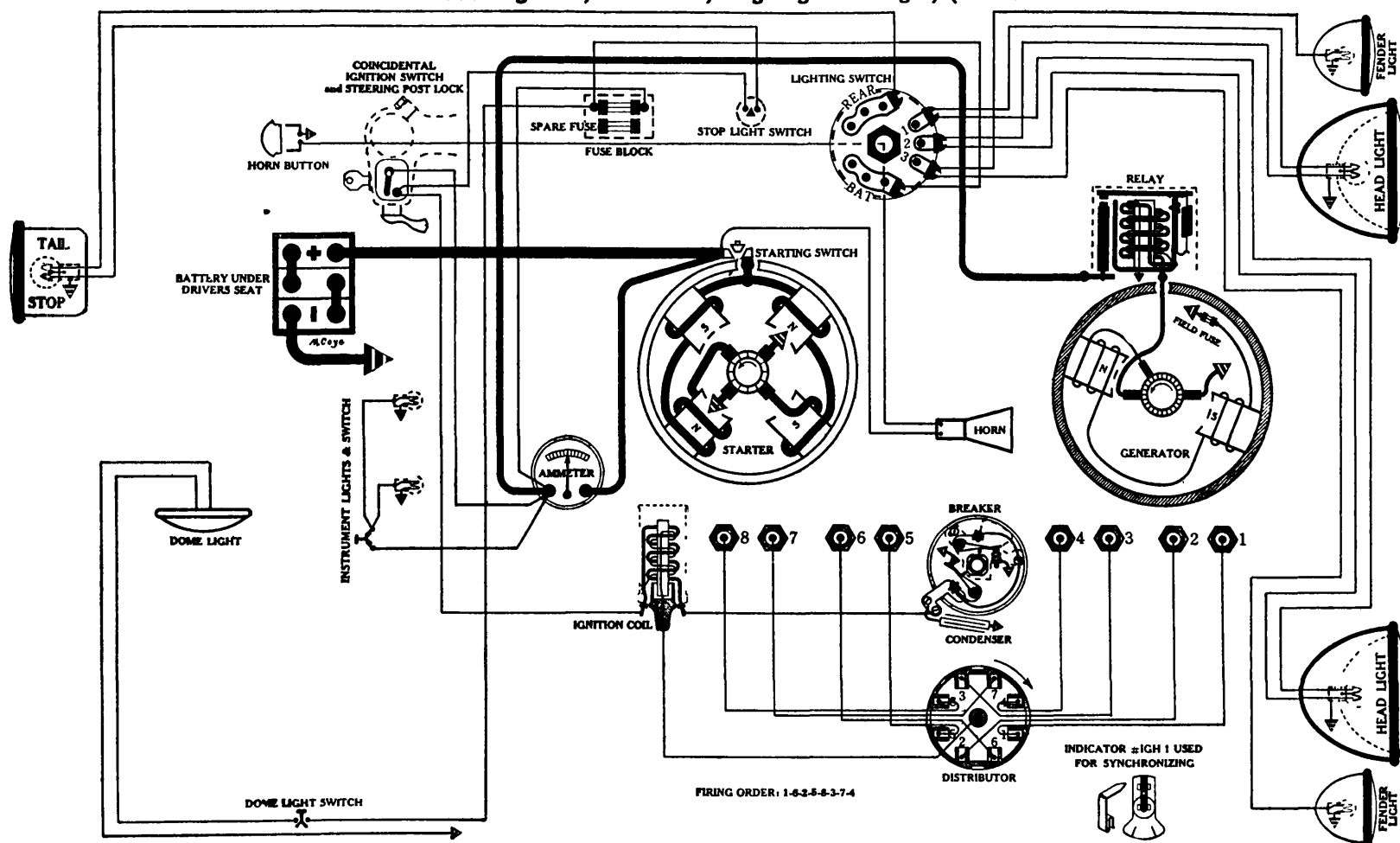
Fuses—Single 20 amp. fuse (type 3A-20), with spare, mounted on dash, left side, under hood.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX.—63 DOME—64; INSTRUMENT—63; STOP AND TAIL—1158.

NOTE—This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

NASH

Model Eight-70, Series 870, Singl Ignition Eight, (1931)



BATTERY

U. S. L., 3HVX-6X-7A, 6 volts. Negative Terminal Grounded.
Starting Capacity—127 amps. for 20 minutes.
Lighting Capacity—5 amps. for 23½ hours.
Box—Length, 10 7/16; width, 7 7/16; height, 9¼ inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4026

Connection to Engine—Bendix Drive.
Running Free—46 amps. at 5.5 volts, 4020 R.P.M.
Cranking Engine—160 to 170 amps. at 4.2 volts.
Lock Torque—17 pound-feet, 520 amps. at 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Auto-Lite, MAB-3083, mounted on starter. Switch should not close with less than 4 lbs. pull applied at right angles to hole in extreme end of lever.
Armature—Auto-Lite, MAB-2057.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGH-4017

(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch.
Contact Spring Tension—17 to 19 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing—With No. 1 piston on compression stroke, notch cut in fly-wheel opposite pointer, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2.
Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .008 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—Metric (AC type G-14); Gap .020 inch.
Firing Order—1-6-2-5-8-3-7-4.
Automatic Advance—28 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0	300	0
1200	6	600	3
1800	12	900	6
2400	18	1200	9
3000	24	1500	12
3400 (Max.)	28	1700	14

Coil—Auto-Lite, CE-4001.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4329, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0	600	6.3
6	800	6.9
10	1000	7.1
13	1200	7.5
15	1400	7.7
17	1900 (Max.)	8.

Motoring Freely—4 to 4½ amps. at 6 volts.
Max. Stall Current—16 to 19 amps. at 6 volts.
Field Test—4 amps. at 6 volts across field coils in series.
Field Fuse—7½ amps. (type 1A-7½).
Brush Spring Tension—10 to 13 oz. on each.
Armature—Auto-Lite, GAL-2006.
Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

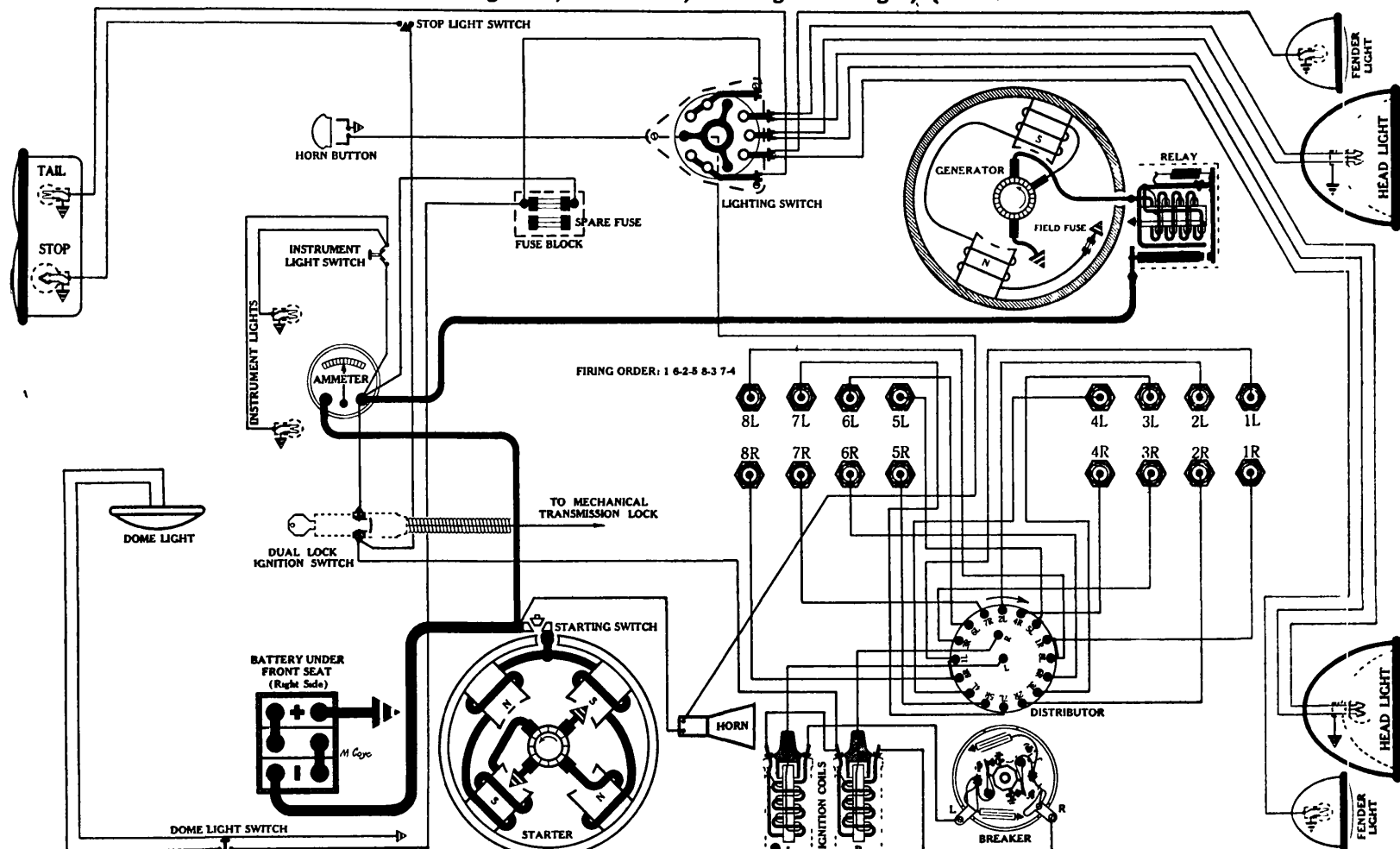
Closes—7 to 7½ volts.
Opens—½ to 2½ amps. discharge.
Contact Gap—.025 to .035 inch
Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold No. 4210-A.
Location—Foot of steering column. Lights controlled by lever on steering wheel.
Fuses—Single 20 amp. fuse (type 3A-20), with spare, mounted on dash, left side, under hood.
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; DOME—64; INSTRUMENT—63; STOP AND TAIL—1158.
NOTE:—This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

NASH

Model Eight-80, Series 880, Twin Ignition Eight, (1931)



BATTERY

U. S. L., 3HVX-6X-7A, 6 volts. Positive Terminal Grounded.
Starting Capacity—127 amps. for 20 minutes.
Lighting Capacity—5 amps. for 23½ hours.
Box—Length, 10 7/16; width, 7 7/16; height, 9¼ inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4033

Connection to Engine—Bendix Drive.
Running Free—46 amps. at 5.5 volts, 4020 R.P.M.
Cranking Engine—160 to 170 amps. at 4.2 volts.
Lock Torque—17 pound-feet, 520 amps. at 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Auto-Lite, MAB-2079-A, mounted on starter.
Switch should not close with less than 4 lbs. pull applied at right angles to hole in extreme end of lever.
Armature—Auto-Lite, MAB-2047.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGK-4003

Breakers—Contact separation .020 inch.
Contact Spring Tension—22 to 26 oz. on each.
NOTE:—Contact spring tension exceptionally heavy. This tension must be maintained to insure smooth running and high speed performance.
Synchronizing—Adjust both breakers to open simultaneously.
Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke slowly hand crank engine until notch in flywheel marked "IGN" is opposite pointer in case. With rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using special attachment for adapter No. 113 and rod No. 37. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .072 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.
Spark Plugs—Special 14 millimeter Metric (AC type K-12); Gap .020 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—38 degrees (on Flywheel).

Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	0	200	0
600	2	300	1
1200	8	600	4
2000 (Max.)	16	1000	8

Coils—Auto-Lite, CE-4011.

Ignition Switch—Delco-Remy, 425-P, "Dual Lock." (Combination Ignition Switch and Mechanical Transmission Lock).

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAR-4204, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	500	6.5	14	1200	8.
2	550	6.9	16	1300	8.1
6	800	7.3	18	1450 (Max.)	8.3
10	1000	7.8			

Motoring Freely—5½ amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 6 volts.

Field Test—5 amps. at 6 volts across field coils in series.

Field Fuse—7½ amps. (type 1A-7½).

Brush Spring Tension—22 to 25 oz. on main; 31 to 34 on third.

Armature—Auto-Lite, GAR-2214.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-C.

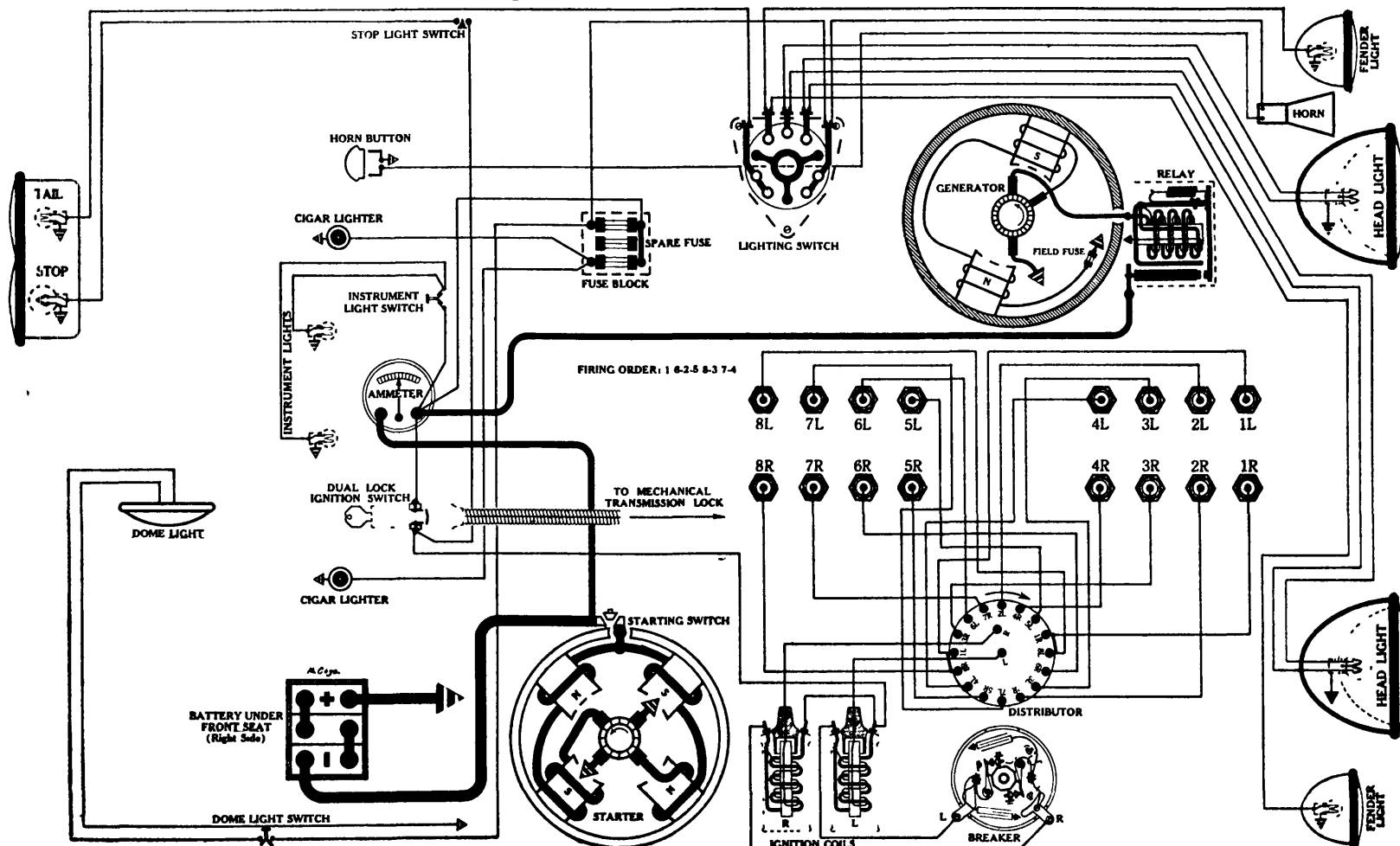
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20), with spare, mounted on dash, left side, under hood.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; STOP—87; TAIL—63; DOME—64.

NASH

Model Eight-90, Series 890, Twin Ignition Eight, (1931)



BATTERY
Exide, 3-MXC-17-1, 6 volts. Positive Terminal Grounded.
Starting Capacity—152 amps. for 20 minutes.
Lighting Capacity—5 amps. for 18 hours.
Box—Length, 11 $\frac{1}{8}$; width, 7 $\frac{1}{8}$; height, 9 $\frac{9}{32}$ inches.

STARTER
Rotation, L. H., Com. End
Auto-Lite, MAB-4024
Connection to Engine—Bendix Drive.
Running Free—46 amps. at 5.5 volts, 4020 R.P.M.
Cranking Engine—160 to 170 amps. at 4.2 volts.
Lock Torque—17 pound-feet, 520 amps. at 3 volts
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Auto-Lite, MAB-3083, mounted on starter. Switch should not close with less than 4 lbs. pull applied at right angles to hole in extreme end of lever.
Armature—Auto-Lite, MAB-2073.

IGNITION
Rotation, R. H., Top View
Auto-Lite, IGK-4001
Breakers—Contact separation .020 inch.
Contact Spring Tension—22 to 26 oz. on each.
NOTE:—Contact spring tension exceptionally heavy. This tension must be maintained to insure smooth running and high speed performance.
Synchronizing—Adjust both breakers to open simultaneously.
Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke slowly hand crank engine until notch in flywheel marked "IGN" is opposite pointer in case. With rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 33. Slowly hand crank engine until No. 1 piston is coming up on compression stroke when .077 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.
Spark Plugs—Metric (AC type J-9); Gap .020 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—38 degrees (on Flywheel).
Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist R.P.M.	Degrees Advance (on cam)
400	0	200	0
800	4	400	2
1200	8	600	4
1600	12	800	6
2000 (Max.)	16	1000	8

Coils—Auto-Lite, CE-4011.
Ignition Switch—Delco-Remy, 425-S, "Dual Lock" (Combination Ignition Switch and Mechanical Transmission Lock)

GENERATOR
Rotation, L. H., Com. End
Auto-Lite, GAR-4204, (Belt Drive)
Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0	500	6.5
2	550	6.9
6	800	7.3
10	1000	7.8
14	1200	8.
16	1300	8.1
18	1450 (Max.)	8.3

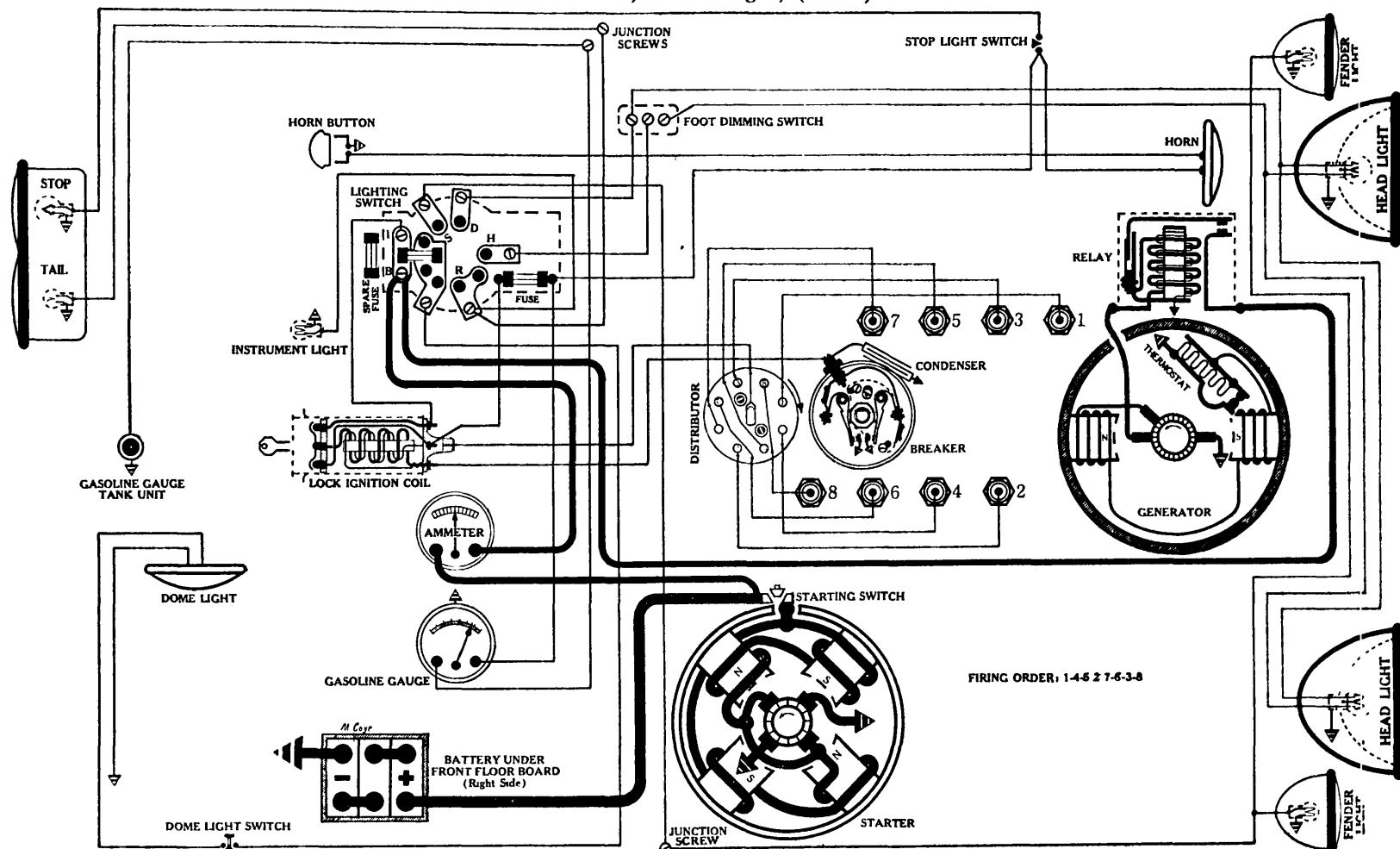
Motoring Freely—5 $\frac{1}{2}$ amps. at 6 volts.
Max. Stall Current—23 to 25 amps. at 6 volts.
Field Test—5 amps. at 6 volts across field coils in series.
Field Fuse—7 $\frac{1}{2}$ amps. (type 1A-7 $\frac{1}{2}$).
Brush Spring Tension—22 to 25 oz. on main; 31 to 34 on third.
Armature—Auto-Lite, GAR-2214.
Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY
Auto-Lite, CB-4014
Closes—7 to 7 $\frac{1}{2}$ volts.
Opens— $\frac{1}{2}$ to 2 $\frac{1}{2}$ amps. discharge.
Contact Gap—.025 to .035 inch
Core Gap—.010 to .012 inch, contacts closed.

LIGHTING
Switch—Delco-Remy, 486-K.
Location—Foot of steering column. Lights controlled by lever on steering wheel.
Fuses—Two 20 amp. fuses (type 3A-20), with spare, mounted on dash, left side, under hood.
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; STOP—87; TAIL—63; DOME—64.

OAKLAND

Model 301, "Vec" Eight, (1931)



BATTERY

Delco-Remy, 15A, 6 volts. Negative Terminal Grounded.
Starting Capacity—137 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours
Box—Length, 10 7/32; width, 7; height, 9 3/16 inches

STARTER

Rotation, L. H., Com. End
Delco-Remy, 726-H

Connection to Engine—Delco-Remy Mechanical Shift.
Running Free—65 amps at 5 volts, 6000 R.P.M.
Cranking Engine—180 to 185 amps at 4.5 volts
Lock Torque—15 pound-feet 570 amps., 3.15 volts
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 820052.
Armature—Delco-Remy, 827025.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 959-Z, (Belt Drive)

Performance Data—Gen cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4¼ to 5½ amps. at 6 volts across field coils in series

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 1836929.

Third Brush Adjustment—Loosen cover band. See Fig 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9191.

Location—Behind instrument board. Operated by pull knob

Fuses—(Lighting) 20 amp. fuse (type 3A-20) mounted on switch back (Stop and Horn) 20 amp. fuse (type 3A-20) mounted on switch support.

Foot Dimming Switch—Delco-Remy, 465-J.

Location—On toe board (left side). Tilt beam controlled by press-

ing foot plunger.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; STOP—87; TAIL—63.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 661-B

(Full Automatic Spark Advance)

IMPORTANT NOTE:—The 661-B Delco-Remy Distributor was new in 1931. This unit uses an EIGHT POINT CAM, and both sets of breaker arms operate SIMULTANEOUSLY. Not necessary to synchronize to assure equal intervals between engine explosions. See Sec. AA for details.

Breakers—Contact separation .018 inch.

NOTE:—Due to the peculiar design of the ignition cam, to insure good high speed performance, the contact separation must be accurately adjusted to .018 inch and NO MORE.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Adjust both breakers to open simultaneously.

Timing—With No. 1 piston (left bank, nearest radiator) on T.D.C., power stroke, rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 8. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .018 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.

Spark Plugs—Metric (AC type G-12); Gap .025 inch.

Firing Order—1-4-5-2-7-6-3-8 (numbering from front to rear, odd numbers on left side).

Manual Advance—(None).

Automatic Advance—26 degrees (on Flywheel).

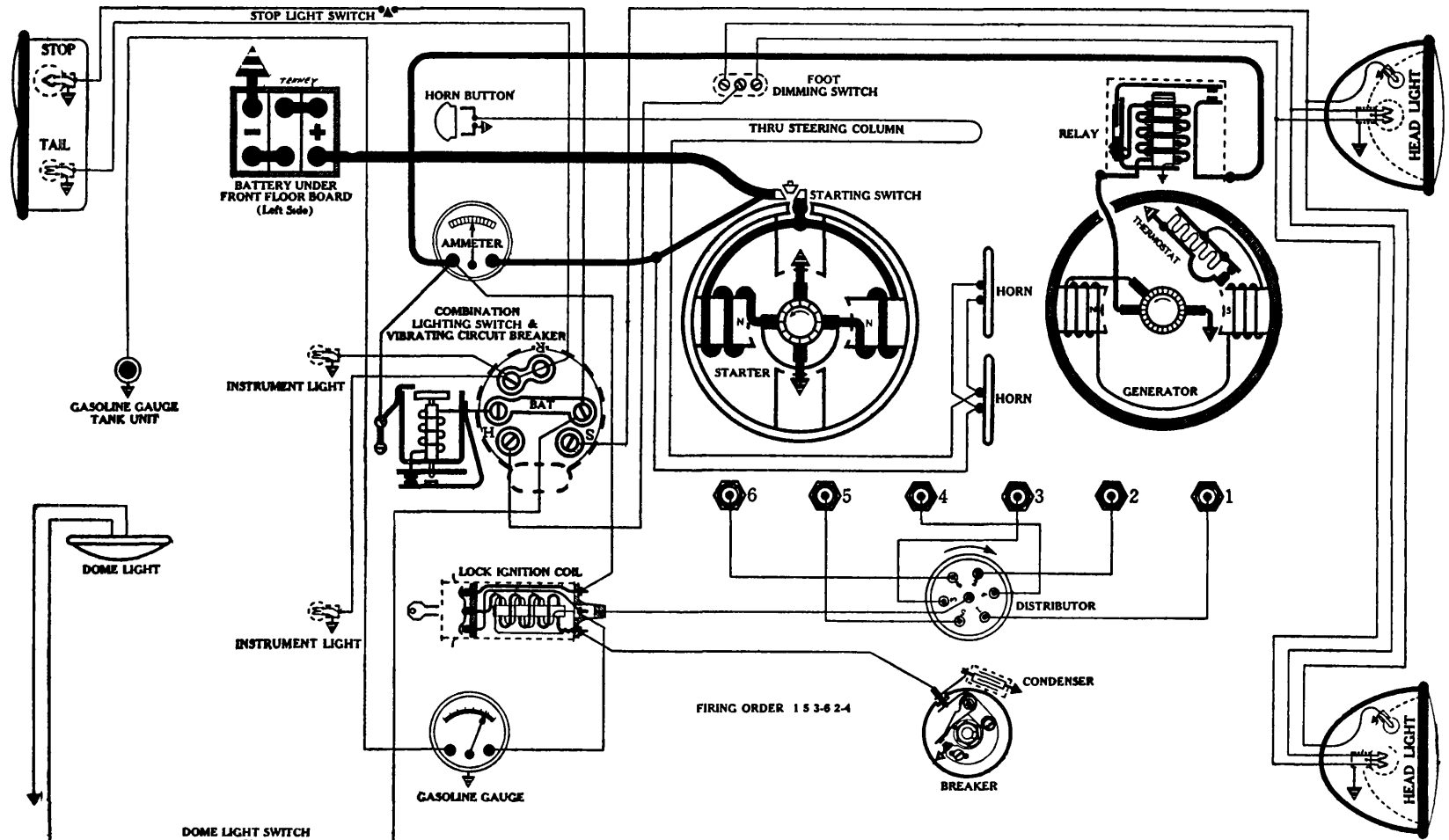
Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	0	400	0
1200	6	600	3
1600	12	800	6
2000	17	1000	8½
2400	23	1200	11½
2700 (Max.)	26	1350	13

Lock Ignition Coil—Delco-Remy, 526-R.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked. Feed for gasoline gauge, stop light, and horn taken from "Gauge" terminal of coil, thru fuse on lighting switch bracket.

OLDSMOBILE

Mod 1 F-31, 6 cyl., (1931)



BATTERY

Willard, WS-1-13, 6 volts. Negative Terminal Grounded.
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—5 amps. for 17 hours.
Box—Length, 9 1/16; width, 7 1/16; height, 8 7/8 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-H

Connection to Engine—Mechanical gear shift, incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R. P. M.

Cranking Engine—175 to 180 amps. at 4.5 volts.

Lock Torque—12 pound-feet, 475 amps., 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 639-G

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch

Contact Spring Tension—18 to 20 oz.

Timing—With No. 1 piston on T.D.C., power stroke, flywheel mark "1 & 6 T.D.C." opposite pointer, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .030 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (AC Type G-12); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—24 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	0	200	0
800	4	400	2
1200	8	600	4
1800	14	900	7
2200	18	1100	9
2800 (Max.)	24	1400	12

Lock Ignition Coil—Delco-Remy, 533-U.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-R (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Armature—Delco-Remy, 817807.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-F, Combination Switch and Current Limit Relay.

Location—Behind instrument board, operated by pull knob.

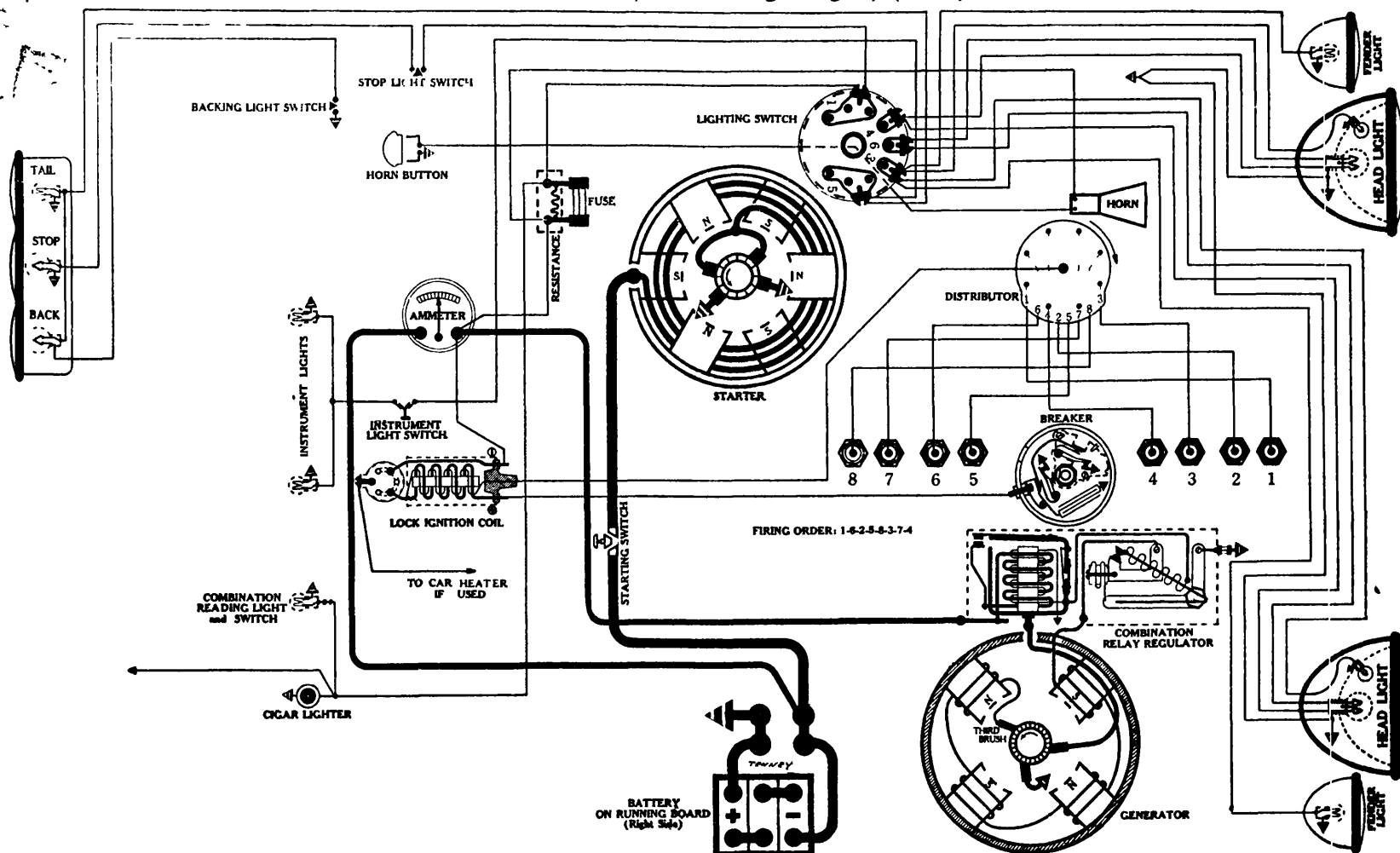
Vibrating Circuit Breaker—Starts, 25 to 30 amps. Operates, 10 to 15 amps.

Foot Dimming Switch—Delco-Remy, 465-J

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

PACKARD

Models 826 and 833, Small Straight Eights, (1931)



BATTERY

Prest-O-Lite, A-6-17-S, 6 volts. Positive Terminal Grounded.
Starting Capacity—150 amps. for 20 minutes.
Lighting Capacity—5 amps for 32 hours.
Box—Length, 13; width, 7; height, 9 1/2 inches.

STARTER

Rotation, L. H., Com. End
Owen-Dyneto, Type DI-850

Connection to Engine—Bendix Drive.
Running Free—60 amps. at 6 volts, 4500 R P M
Cranking Engine—260 to 280 amps. at 4 volts
Lock Torque—25 pound-feet, 650 amps., 3 1/2 volts
Brush Spring Tension—26 to 28 oz. on each.
Armature—Owen-Dyneto, 13292.

IGNITION

Rotation, R. H., Top View
North East, Model TEU, Type 10896

NOTE:—This unit uses an EIGHT POINT CAM, and both sets of breaker arms operate simultaneously. Not necessary to synchronize to assure equal intervals between engine explosions.

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Adjust both breakers to open simultaneously.

Timing—With No. 1 piston on compression stroke, spark fully advanced, bring flywheel mark "Spark 1" opposite pointer, with rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open. Flywheel mark "Spark 1" is 29/32 of an inch before "Upper D.C. No. 1."

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .019 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.

Spark Plugs—3/8 inch (Champion, type C-5); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—38 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	0	400	0
1000	2	500	1
1200	5	600	2 1/2
1600	10	800	5
2000	16	1000	8
2200 (Max.)	20	1100	10

Lock Ignition Coil—North East, No. 5025430

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Extra terminal at base of coil "alive" when ignition is "on." Car heater electric motor attached to this terminal.

GENERATOR

Rotation, L. H., Com. End
Owen-Dyneto, Type CL-896

IMPORTANT NOTE:—The drive end generator bearing is part of engine. Do not run unit in test bench until special Dyneto bearing is attached.

Performance Data—Gen. cold. Charge regulator closed.

Amps.	R.P.M.	Volts
0	480	6.4
4	550	7.
10	775	7.3
16	975	7.7
18	1300 (Max.)	8.

Motoring Freely—3 1/2 to 4 amps. at 6 volts

Max. Stall Current—26 to 28 amps at 6 volts.

Field Test—2 1/2 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5), mounted in charge regulator.

Brush Spring Tension—20 to 22 oz. on each.

Armature—Owen-Dyneto, 23214.

Third Brush Adjustment—Remove cover cap. See Fig. 25, P. 7, Sec. AA

CHARGE REGULATOR & RELAY

Owen-Dyneto, Type 20220.

Relay Closes—6 1/2 to 7 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.015 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

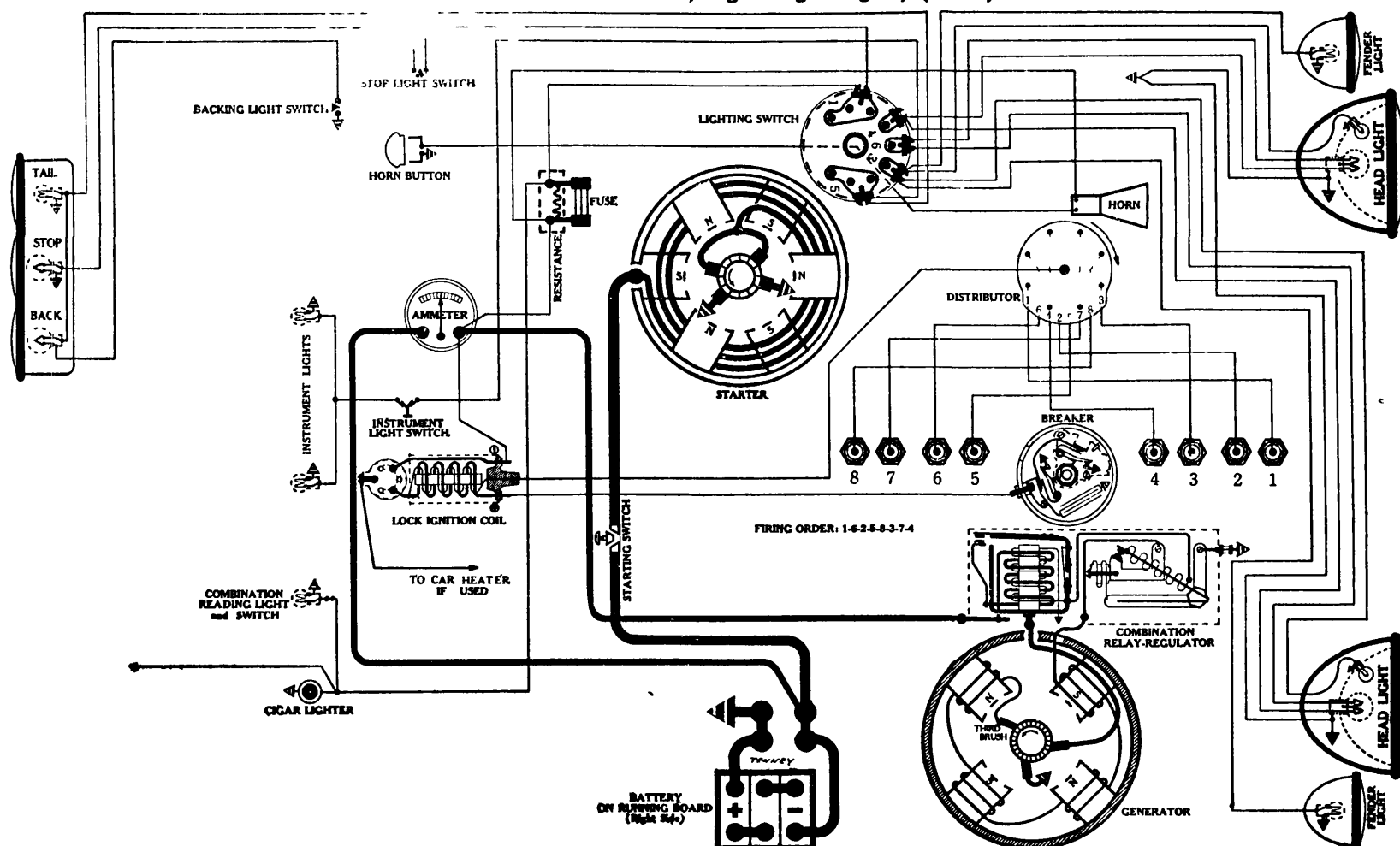
Switch—Clum, No. 9170.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—20 amp. fuse (type 5A-20), mounted on North East Fuse Block and Resistance Assembly No. 5021100.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; AUX.—63; INSTRUMENT—63; DOME—81; TONNEAU—63; TAIL—63; STOP—1129; BACK—1129; READING—63.

Models 840 and 845, Big Straight Eights, (1931)



Prest-O-Lite, A-6-17-S, 6 volts. Positive Terminal Grounded.

STARTER

IGNITION

North East, Model TEU, Type 10896

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Adjust both breakers to open simultaneously.

Timing—With No. 1 piston on compression stroke, spark fully advanced, bring flywheel mark "Spark 1" opposite pointer, with rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open. Flywheel mark "Spark 1" is 29/32 of an inch before "Upper D.C. No. 1"

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .019 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.

Spark Plugs— $\frac{7}{8}$ inch (Champion, type C-5); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—38 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	0	400	0
1000	2	500	1
1200	5	600	2½
1600	10	800	5
2000	16	1000	8
2200 (Max.)	20	1100	10

Lock Ignition Coil—North East, No. 5025430.

NOTE:—This unit is a combined ignition switch and coil. Impossible to “jump out” ignition switch with wire to run engine. Extra terminal at base of coil “alive” when ignition is “on.” Car heater electric motor attached to this terminal.

Rotation, L. H., Com. End
Owen-Dyneto, Type CL-896

IMPORTANT NOTE:—The drive end generator bearing is part of engine. Do not run unit in test bench until special Dyneto bearing is attached.

Performance Data—Gen. cold. Charge regulator closed.

Amps.	Gen. cond.	Large regulator	closed.
		R.P.M.	Volts
0	-	480	6.4
4	-	550	7.
10	-	775	7.3
16	-	975	7.7
18	-	1300 (Max.)	8.

Motoring Freely— $3\frac{1}{2}$ to 4 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—2½ amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5), mounted in charge regulator.

Brush Spring Tension—20 to 22 oz. on each.

Armature—Owen-Dyneto, 23214.

Third Brush Adjustment—Remove cover cap. See Fig. 25, P. 7, Sec. AA.

CHARGE REGULATOR & RELAY

Owen-Dyneto, Type 20220

NOTE: For special instructions on theory of operation and how to service Regulator, see Sec. AA.

Relay Closes—6½ to 7 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.015 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Clum. No. 9170.

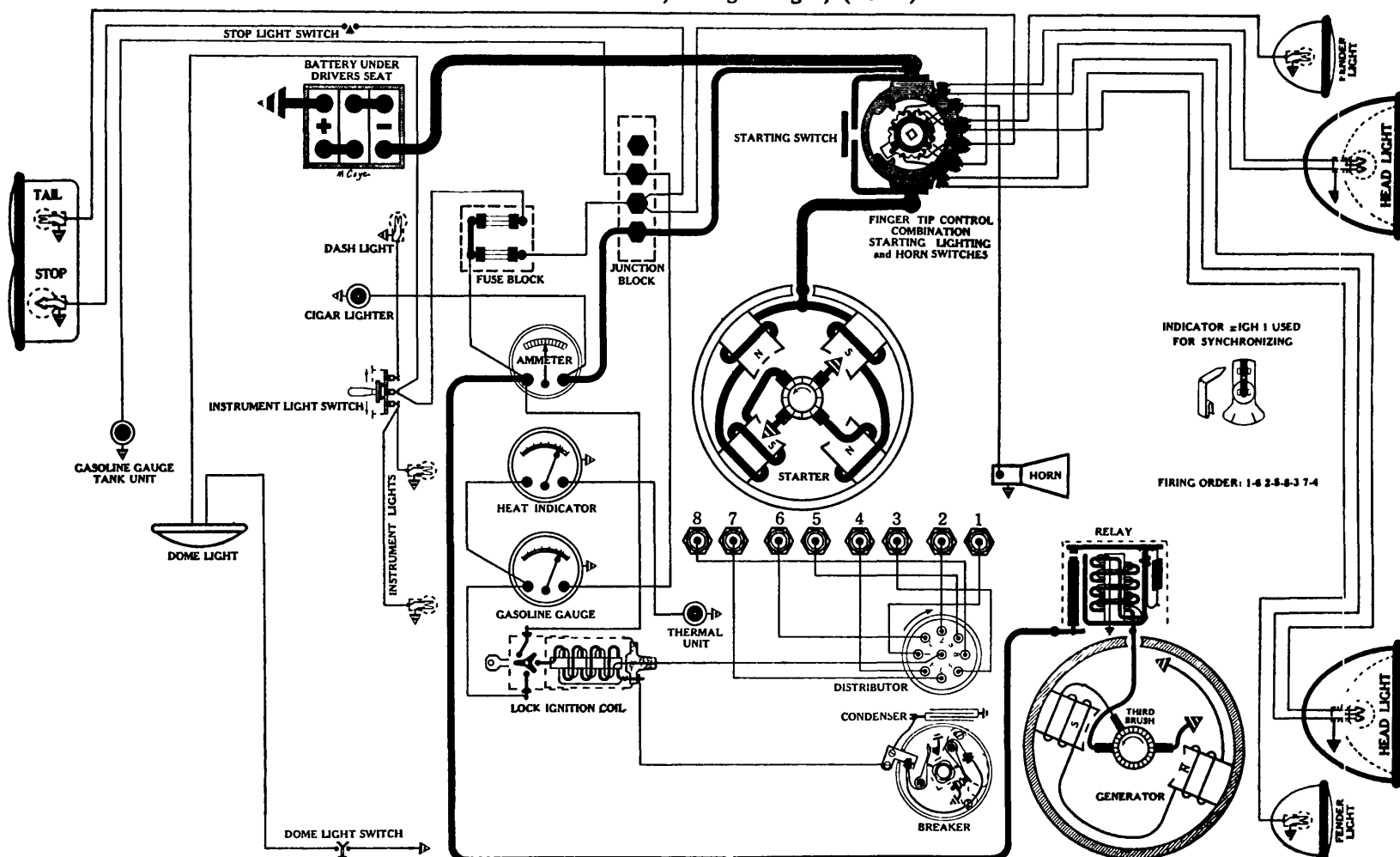
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—20 amp. fuse (type 5A-20), mounted on North East Fuse Block and Resistance Assembly No. 5021100.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; AUX.—63; INSTRUMENT—63; DOME—81; TONNEAU—63; TAIL—63; STOP—1129; BACK—1129; READING—63.

PEERLESS

Model Standard A, Straight Eight, (1931)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded.
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7 1/16; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4029

Connection to Engine—Bendix Drive.
Running Free—60 amps. at 6 volts, 4150 R.P.M.
Cranking Engine—160 to 170 amps. at 5 volts.
Lock Torque—17 pound-feet, 520 amps. at 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Located foot of steering column. Operated by pulling up on horn button.
Armature—Auto-Lite, MAB-2046.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGH-4011-A

Breakers—Contact separation .020 inch.
Contact Spring Tension—17 to 19 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing—With No. 1 piston on compression stroke bring flywheel mark "IGN" (which is 5/8 inch before T.D.C.) opposite pointer, spark lever fully advanced, rotor opposite No. 1 Dist Cap Terminal, stationary set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .013 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (Champion No 10); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	0	400	0
1600	6	800	3
2400	11	1200	5.5
3200	17	1600	8.5
3600 (Max.)	20	1800	10

Lock Ignition Coil—Auto-Lite, IG-4301.

NOTE:—This is a new type coil, with but one primary terminal at top, which should always be connected to the breaker. Two other primary terminals are located at base of coil, either one of which may be used for the "hot" feed; the other terminal is for the gas gauge or other auxiliary units.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4134

Amps.	R.P.M.	Volts
0	600	6.3
6	800	6.9
10	1000	7.1
13	1200	7.5
15	1400	7.7
17	1900 (Max.)	8.

Motoring Freely—4 1/2 to 5 amps. at 6 volts.
Max. Stall Current—16 to 19 amps. at 6 volts.
Field Test—4 1/2 amps. at 6 volts across field coils in series.
Field Fuse—(None).

Brush Spring Tension—10 to 13 oz. on each.

Armature—Auto-Lite, GAL-2123.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.
Opens—1/2 to 2 1/2 amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Pines Finger Tip Control, No. A-808.

Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.

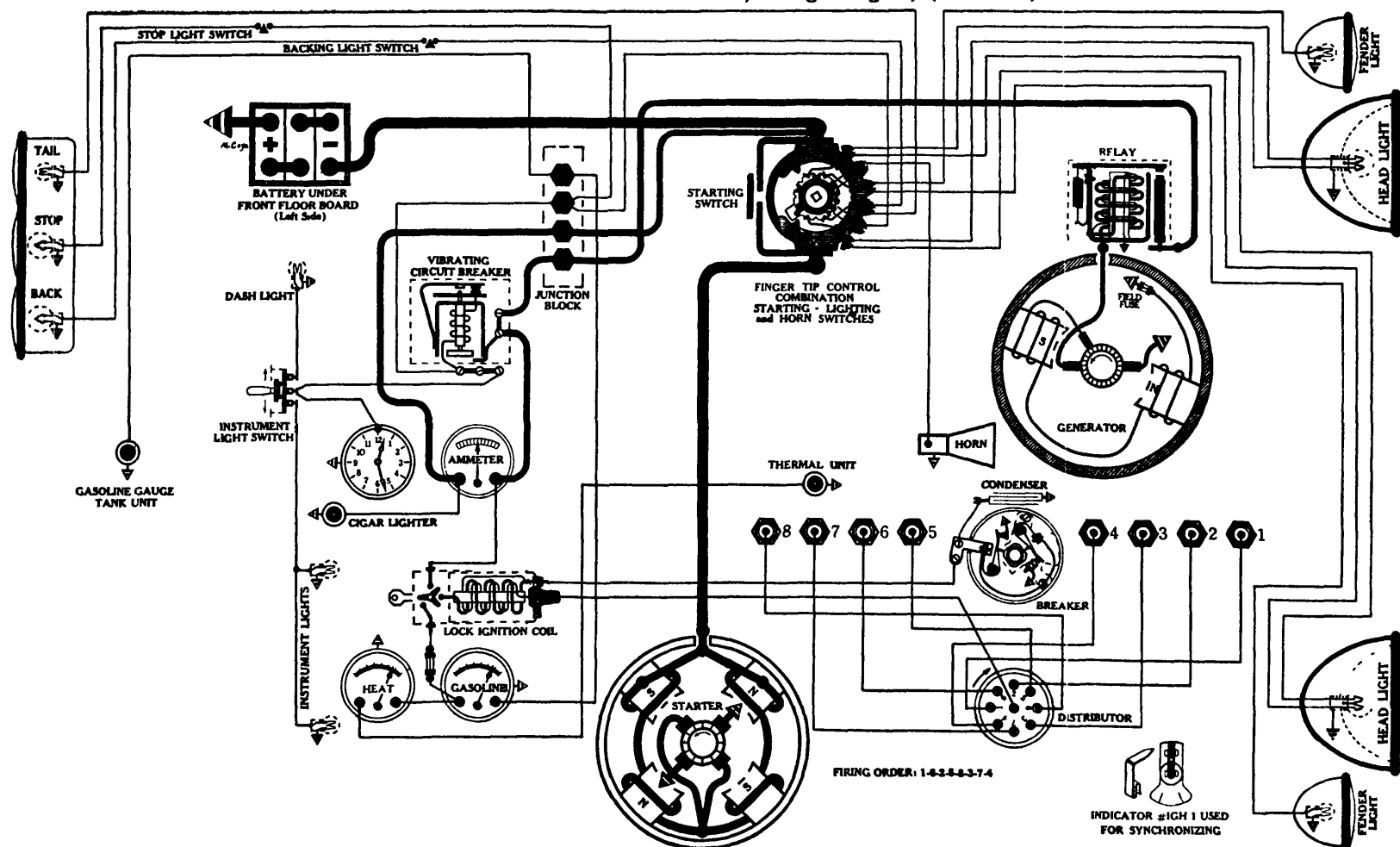
NOTE:—For protective devices 1931 cars may have either fuses or a Delco-Remy Vibrating Circuit Breaker. For circuit breaker data see next page.

Fuses—Two 20 amp fuses (type 3A-20), mounted on dash, driver's side.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—63; TAIL—63; STOP—87.

PEERLESS

Models Master B and Custom C, Straight Eights, (1931-32)



BATTERY

Willard, WSB-19, 6 volts. Positive Terminal Grounded.
Starting Capacity—146 amps. for 20 minutes.
Lighting Capacity—5 amps. for 27 hours.
Box—Length, 13; width, 7 1/16; height, 8 3/4 inches

STARTER

Rotation, L. H., Com. End
Auto-Lite, ML-4146

Connection to Engine—Bendix Drive.
Running Free—44 amps. at 5 1/2 volts, 3288 R.P.M.
Cranking Engine—160 to 170 amps. at 5 volts.
Lock Torque—19 pound-feet, 639 amps. at 3 1/2 volts.
Brush Spring Tension—24 to 32 oz. on each.
Starting Switch—Located foot of steering column. Operated by pulling up on horn button.
Armature—Auto-Lite, ML-2089.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGH-4010

Breakers—Contact separation .020 inch.
Contact Spring Tension—17 to 19 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing—With No. 1 piston on compression stroke bring flywheel mark "IGN" (which is 3/4 inch before T.D.C.) opposite pointer, spark lever fully advanced, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .016 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—Metric (Champion No. 11); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—25 degrees (on Flywheel).
Automatic Advance—20 degrees (on Flywheel).
Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance (on flywheel) (on cam)

800	0	400	0
1600	6	800	3
2400	11	1200	5.5
3200	17	1600	8.5
3600 (Max.)	20	1800	10

Lock Ignition Coil—

NOTE:—This is a new type coil, with but one primary terminal at top, which should always be connected to the breaker. Two other primary terminals are located at base of coil, either one of which may be used for the "hot" feed; the other terminal is for the gas gauge or other auxiliary units.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAR-1111, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.F.M.	Volts
0	500	6.5
2	550	6.9
6	800	7.3
10	1000	7.8
14	1200	8.
16	1300	8.1
18	1450 (Max.)	8.3

Motoring Freely—5 1/2 amps. at 6 volts.
Max. Stall Current—23 to 25 amps. at 6 volts.
Field Test—5 amps. at 6 volts across field coils in series.
Field Fuse—7 1/2 amps. (type 1A-7 1/2).
Brush Spring Tension—22 to 25 oz. on main; 31 to 34 on third.
Armature—Auto-Lite, GAR-2147.
Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.
Opens—1/2 to 2 1/2 amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

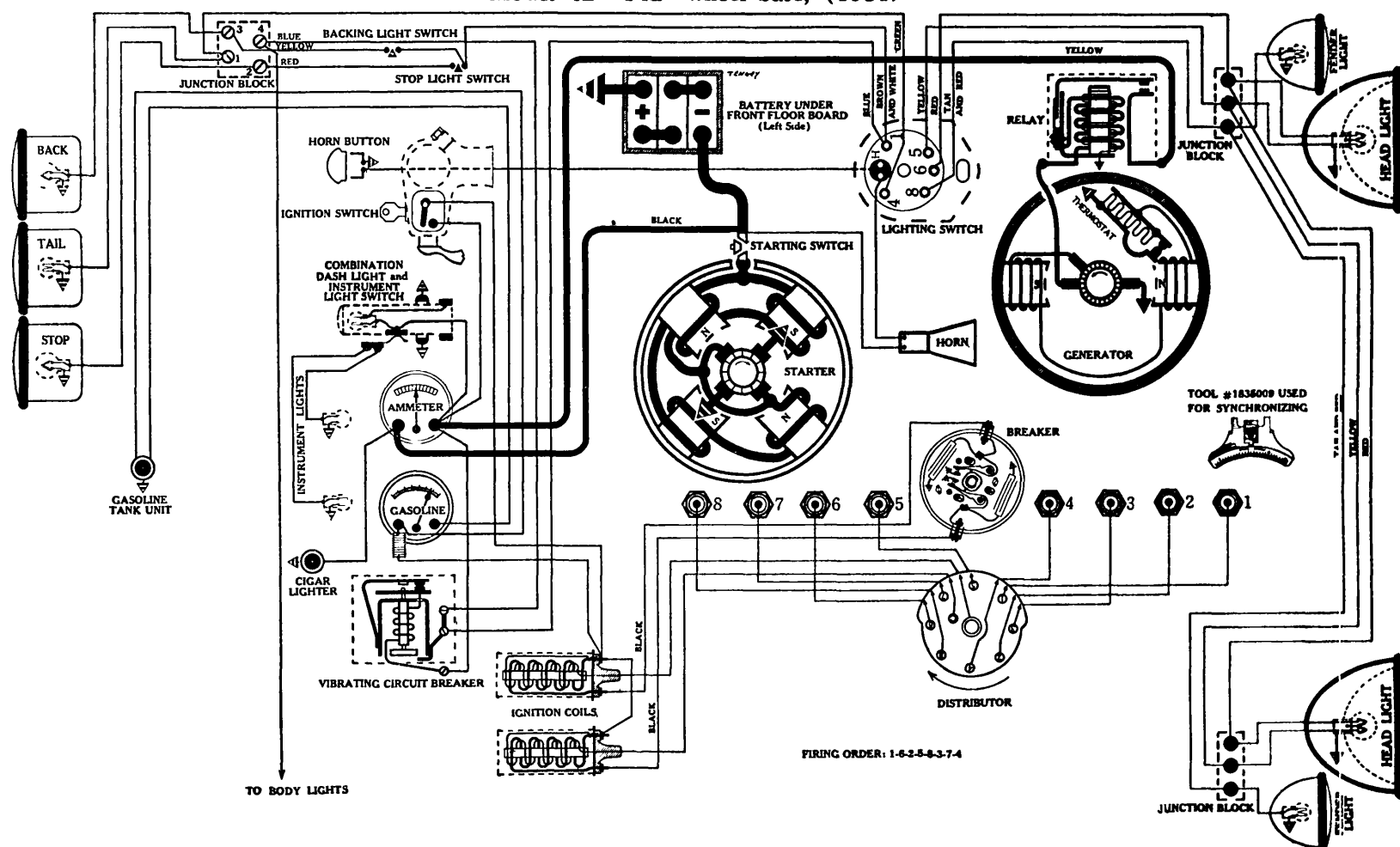
Switch—Pines Finger Tip Control, No. A-808.
Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.
Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25 to 30 amps. Operates 10 to 15 amps.
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—63; TAIL—63; STOP—87; BACK—87.

PIERCE-ARROW

Straight Eights

Model 41—147" wheel base, (1931)

Model 42—142" wheel base, (1931)



BATTERY

Willard, WJ-4-15, 6 volts. Positive Terminal Grounded.
Starting Capacity—145 amps. for 20 minutes.
Lighting Capacity—5 amps. for 26 hours.
Box—Length, 11 11/16; width, 7 1/16; height, 9 3/4 inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 728-C

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter. This is a gear reduction job.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—150 to 160 amps. at 4.4 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 16210.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 668-E

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .030 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—3/8 inch (Champion, type C-4); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—35 degrees (on Flywheel).

Automatic Advance—19 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R P M.	Degrees Advance (on cam)
600	0-2	300	0-1
1000	4	500	2
1500	8	750	4
2500	14	1250	7
3200 (Max.)	19	1600	9.5

Coils—Delco-Remy, 528-E.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combina
tion Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-F (Belt Drive)

Performance Data—Gen. cold. Thermostat closed

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—2 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1837650.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-N.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

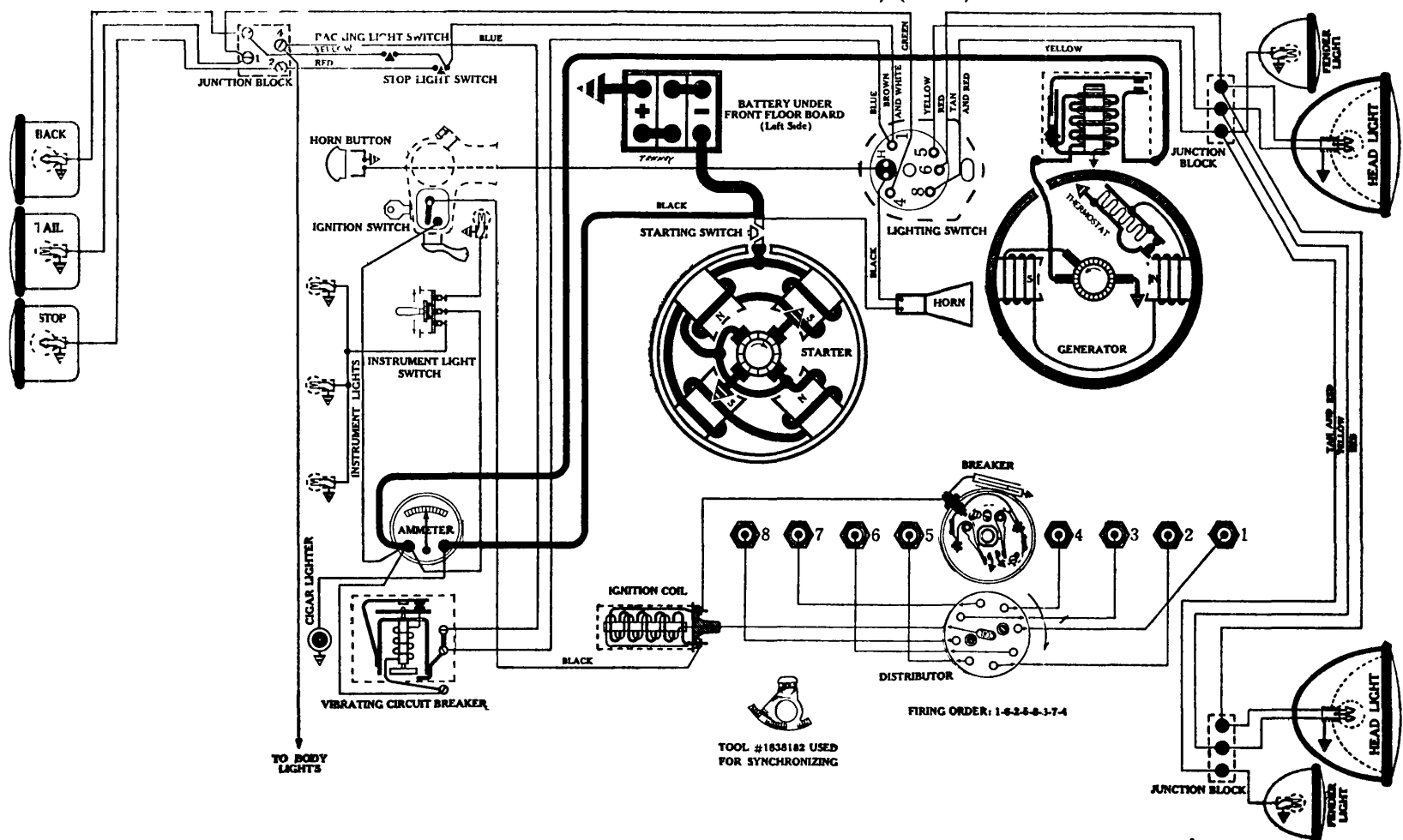
Vibrating Circuit Breaker—Delco-Remy, 410-F. Starts 30 to 35 amps. Operates 5 to 18 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—81; DASH—63; DOME—87; TONNEAU—81; BACK—1123; STOP—1129; TAIL—81.

PIERCE-ARROW

Straight Eights

Model 43—134" and 137" wheel bas , (1931)



BATTERY

Willard, WJ-4-15, 6 volts. Positive Terminal Grounded.
Starting Capacity—145 amps. for 20 minutes.
Lighting Capacity—5 amps. for 26 hours.
Box—Length, 11 11/16; width, 7 1/16; height, 9 1/4 inches

STARTER

Rotation, R. H., Com. End
Delco-Remy, 728-C

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter. This is a gear reduction job.
Running Free—70 amps. at 5 volts, 2500 R.P.M.
Cranking Engine—150 to 160 amps. at 4.4 volts.
Lock Torque—28 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 16210.
Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 660-P

Breakers—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .026 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—3/8 inch (Champion, type C-4); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—33 degrees (on Flywheel).
Automatic Advance—20 degrees (on Flywheel).
Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance
(on flywheel) (on cam)

600	0	300	0
800	2	400	1
1200	6	600	3
1800	12	900	6
2200	16	1100	8
2600 (Max.)	20	1300	10

Coils—Delco-Remy, 528-E.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 927-L

Delco-Remy, 959-F (Belt Drive)

Performance Data—Gen cold.		Thermostat closed	
Amps.	R.P.M.	Volts	Amps.
0	575	6.5	15
3	700	7.	20
6	800	7.1	19
11	1000	7.9	1700
			1450 (Max.)
			8.3

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps at 6 volts

Field Test—2 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1837650.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-N.

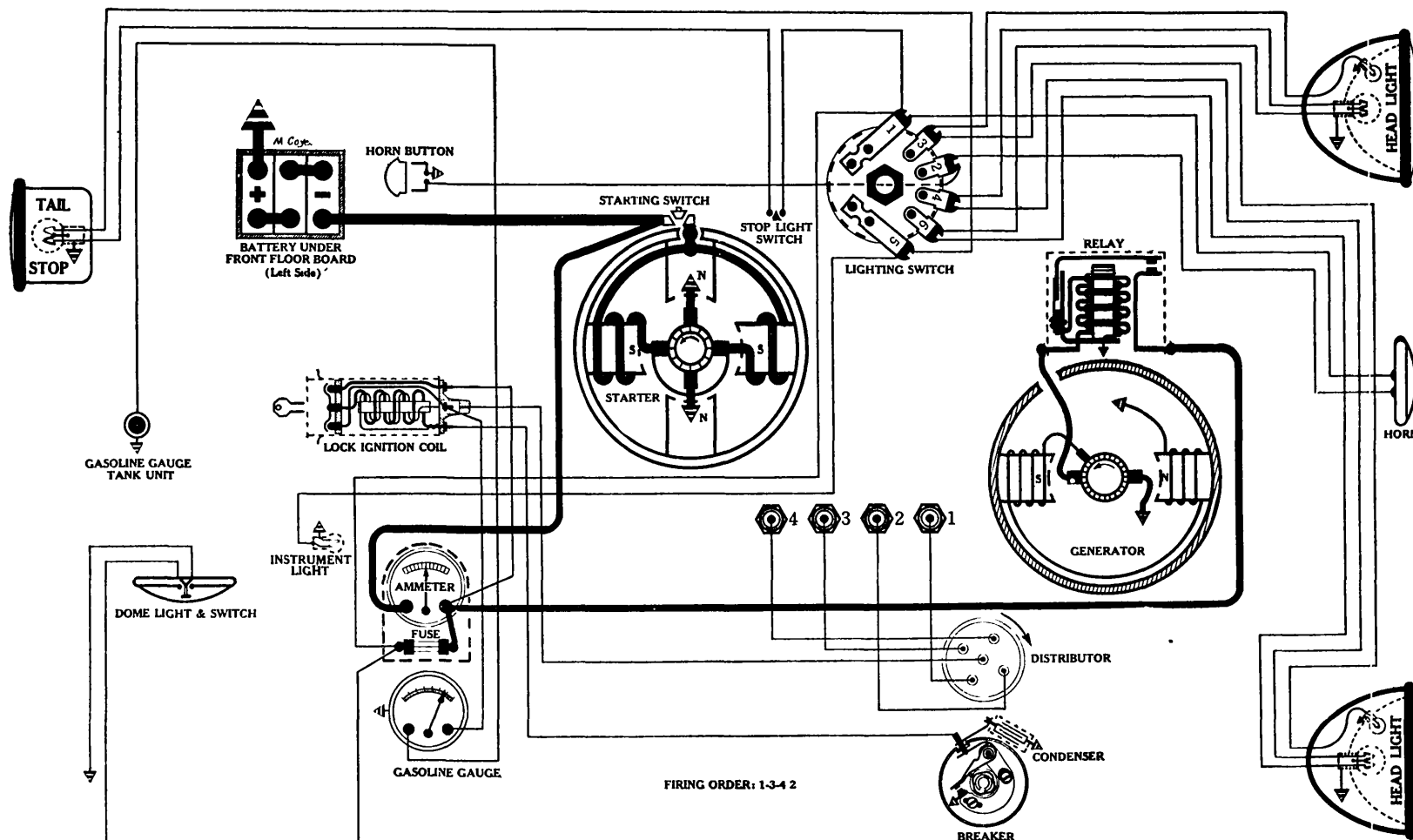
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-F. Starts 30 to 35 amps. Operates 5 to 18 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—81; DASH—63; DOME—87; TONNEAU—81; BACK—1129; STOP—1129; TAIL—81.

PLYMOUTH

Model 30-U, 4 cyl., (1931)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded.

Starting Capacity—98 amps. for 20 minutes.

Lighting Capacity—5 amps. for 17 hours.

Box—Length, 9 1/16; width, 7 1/16; height, 8 7/8 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-Q

Connection to Engine—Mechanical gear shift incorporating over-running disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—160 to 180 amps. at 4.2 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 629-A

Breaker—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz.

Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .050 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (AC type G-12); Gap .022 inch.

Firing Order—1-3-4-2.

Manual Advance—22 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0-2	300	0-1
800	4	400	2
1200	8	600	4
1800	14	900	7
2400	20	1200	10

Lock Ignition Coil—Delco-Remy, 526-M.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 943-R, (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts
0	750	6.5
5	1000	7.2
11	1200	7.9
15	1400	8.
17	2000 (Max.)	8.2

Motoring Freely—4 to 5 amps. at 6 volts.

Max. Stall Current—19 to 20 amps. at 6 volts.

Field Test—3 1/2 to 4 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9150.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

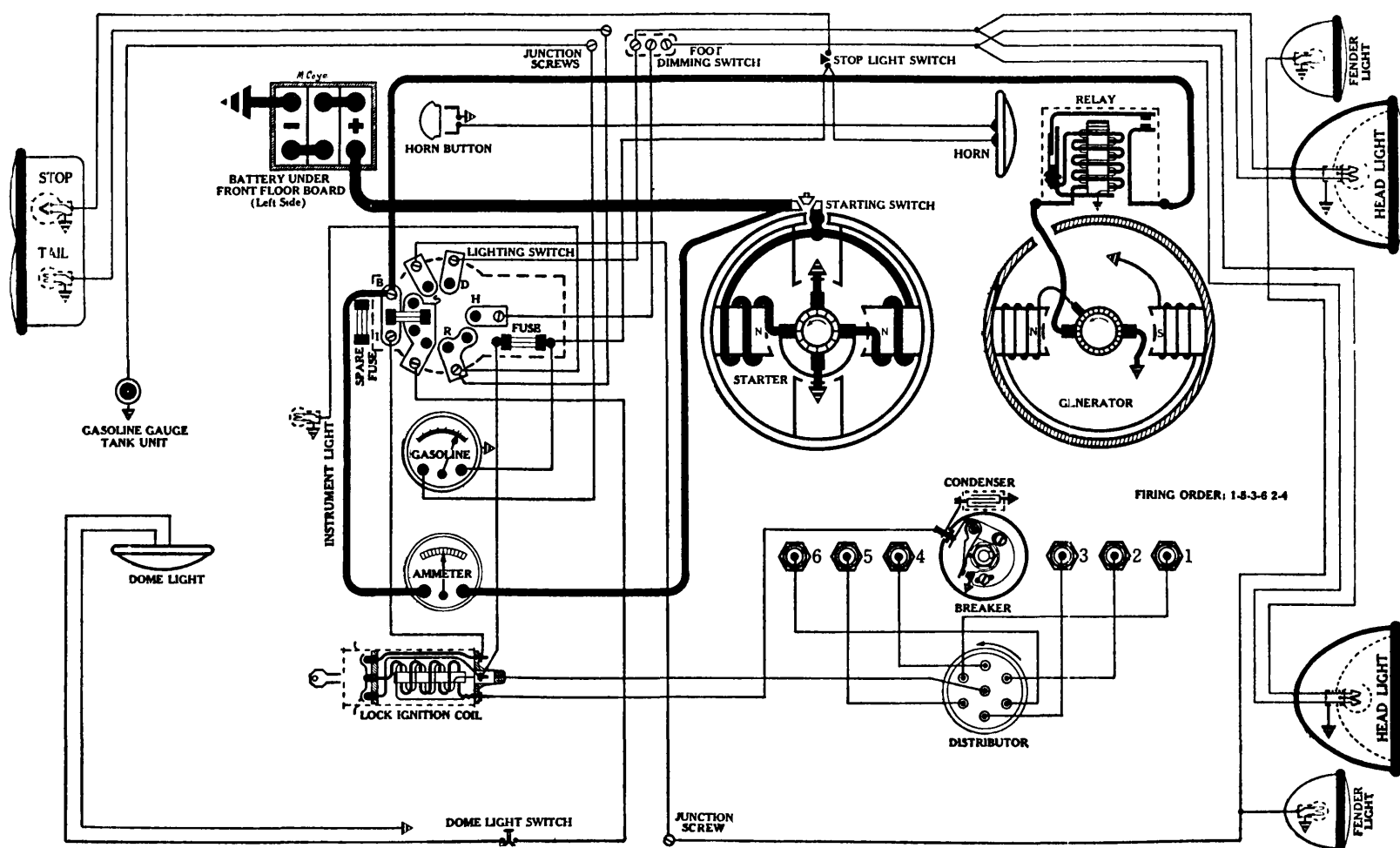
Fuses—Single 20 amp. fuse (type 3A-20) mounted below ammeter, behind instrument board.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

NOTE:—This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

PONTIAC

Model 401, (1931)



BATTERY

Delco-Remy, 13D, 6 volts. Negative Terminal Grounded.
Starting Capacity—102 amps. for 20 minutes
Lighting Capacity—5 amps. for 17 hours.
Box—Length, 9 1/16; width, 7; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-R

Connection to Engine—Delco-Remy Mechanical Shift.
Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—175 to 180 amps. at 4.5 volts.
Lock Torque—12 pound-feet, 475 amps., 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 820052.
Armature—Delco-Remy, 827025.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 639-U

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz.
Timing—With No. 1 piston T.D.C., power stroke, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .005 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—Metric (AC Type G-14); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Manual Advance—(None).
Automatic Advance—24 1/2 degrees (on Flywheel).
Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance (on flywheel) (on cam)
600 0-2 300 0-1
1000 8 500 4
1500 14 750 7
2000 18 1000 9
2600 24 1300 12 1/4
Lock Ignition Coil—Delco-Remy, 526-R.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked. Feed for gasoline gauge, stop light, and horn taken from "gauge" terminal of coil, thru fuse on lighting switch bracket.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 943-J, (Belt Drive)

Performance Data—Gen. cold. No thermostat.					
Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	14	1400	7.9
5	800	7.1	16	1600	8.
9	1000	7.5	18	1700 (Max.)	8.2
12	1200	7.8			

Motoring Freely—5 to 5 1/2 amps. at 6 volts.
Max. Stall Current—17 to 19 amps. at 6 volts.
Field Test—4 1/2 to 5 amps. at 6 volts, across field coils in series.
Brush Spring Tension—16 to 18 oz. on each.
Armature—Delco-Remy, 817221.
Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-G

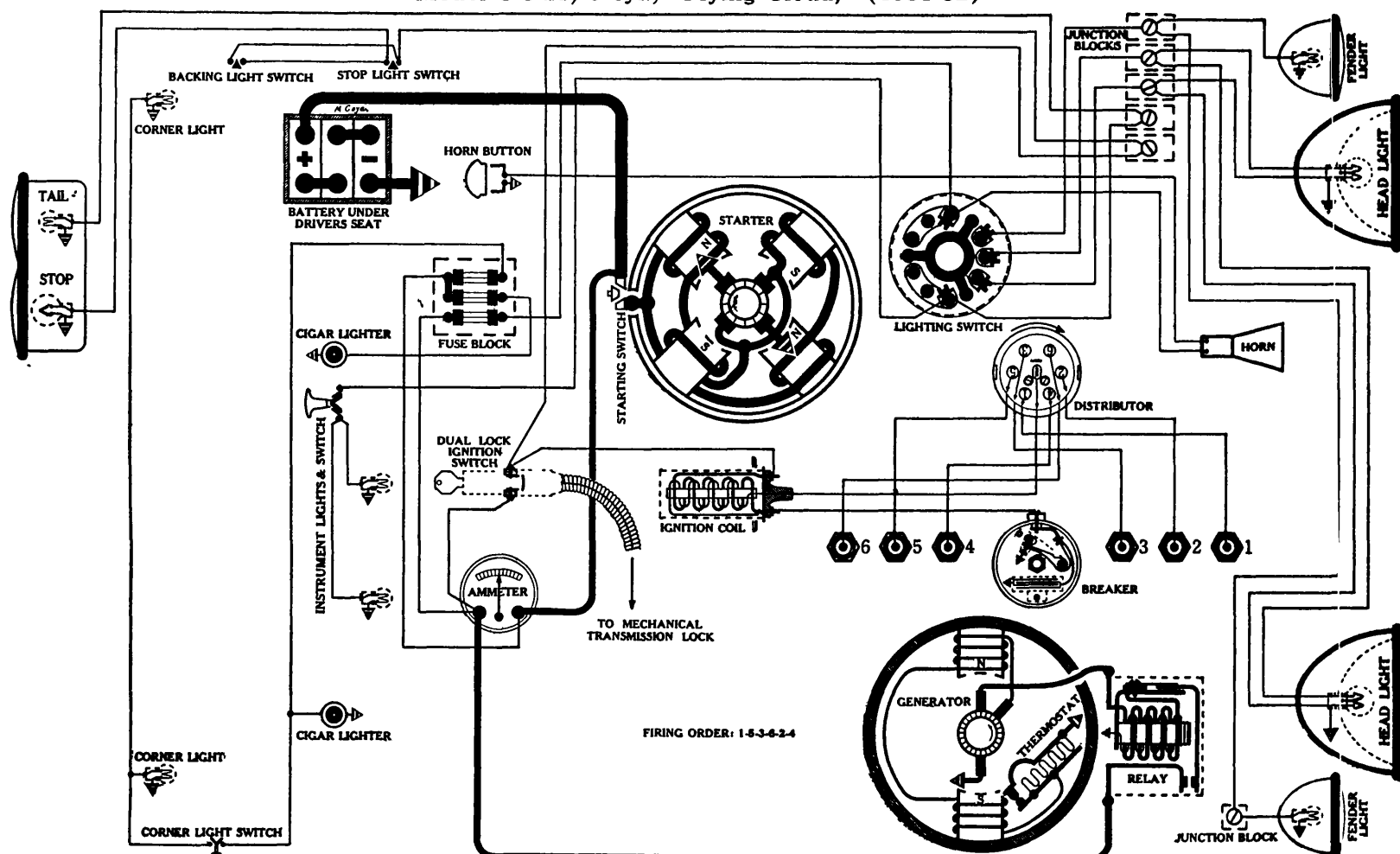
Closes—7 to 7 1/2 volts.
Opens—0 to 2 1/2 amps. discharge.
Contact Gap—.015 to .025 inch.
Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9191.
Location—Behind instrument board. Operated by pull knob.
Fuses—(Lighting) 20 amp. fuse (type 3A-20) mounted on switch back. (Stop and Horn) 20 amp. fuse (type 3A-20) mounted on switch support.
Foot Dimming Switch—Delco-Remy, 465-J.
Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; STOP—87; TAIL—63.

REO

Model C-3-25, 6 cyl., "Flying Cloud," (1931-32)



BATTERY

Willard, WH-2-15, 6 volts. Negative Terminal Grounded.

Starting Capacity—140 amps. for 20 minutes.

Lighting Capacity—5 amps. for 24 hours.

Box—Length, 10 5/16; width, 7 1/16; height, 9 5/16 inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 728-M

Connection to Engine—Mechanical gear shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor. Gear reduction job.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—160 to 180 amps. at 4½ volts.

Lock Torque—28 pound-feet, 600 amps., 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 16210.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 640-S

Breakers—Contact separation .022 inch.

Contact Spring Tension—18 to 20 oz.

Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .035 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (Champion, type C-7); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—19 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
900	0	450	0
1200	4	600	2
1600	9	800	4½
2000	14	1000	7
2400 (Max.)	19	1200	9½

Coil—Delco-Remy, 528-E.

Ignition Switch—Delco-Remy, 425-R, "Dual Lock" (combination ignition switch and mechanical transmission lock).

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-G

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4¼ to 5½ amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Armature—Delco-Remy, 820985.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 482-F.

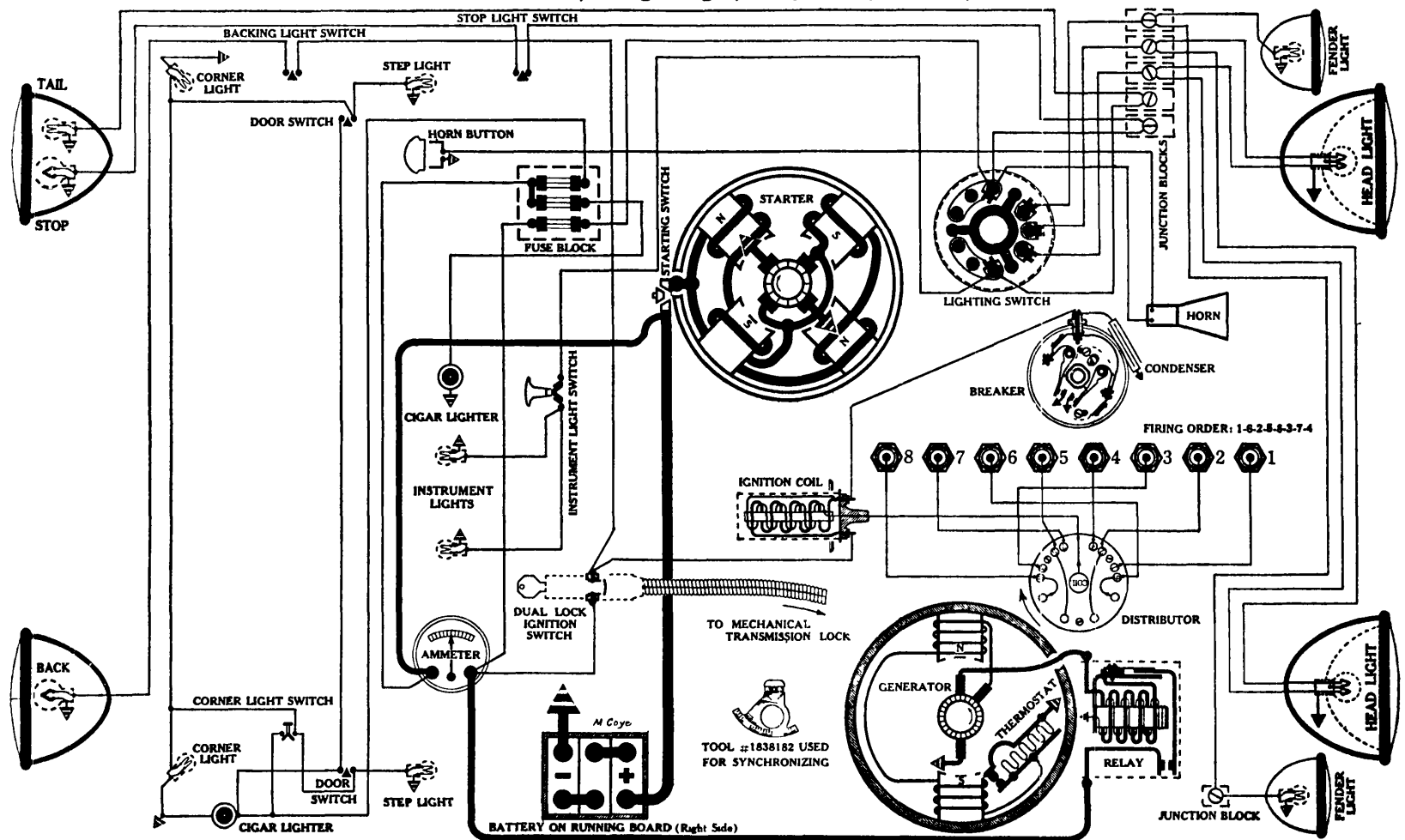
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Three 20 amp. fuses (type 3A-20) mounted on block located behind and above instruments (about center of instrument board).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; CORNER—64; TAIL—63; STOP AND BACK—87.

REO

Mod 18-30, Straight Eight, "Flying Cloud," (1931-32)
Model 8-35, Straight Eight, "Royale," (1931-32)



BATTERY

Willard, WH-4-17, 6 volts. Negative Terminal Grounded.
Starting Capacity—160 amps. for 20 minutes.
Lighting Capacity—5 amps. for 28 hours.
Box—Length, 11 11/16; width, 7 1/16; height, 9 5/16 inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 728-M

Connection to Engine—Mechanical gear shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor. Gear reduction job.

Running Free—70 amps. at 5 volts, 2500 R.P.M.
Cranking Engine—160 to 180 amps. at 4 1/2 volts.
Lock Torque—28 pound-feet, 600 amps., 3 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 16210.
Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 660-K

Breakers—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz.
Synchronizing—Movable points open 45 degrees after stationary.
Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. On engines using straight run gasoline stop when .013 inch before T.D.C. On engines using Ethyl gasoline stop when .048 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal stationary set of breaker points should just open.

Spark Plugs—Metric (Champion, Type C-7); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Degrees Advance (on cam)
800	0	0
1200	4	2
1600	8	4
2100	12	6
2500	16	8
3000	20	10
3200 (Max.)	22	11

Coil—Delco-Remy, 528-E.

Ignition Switch—Delco-Remy, 425-R (3 speed), or 425-T (4 speed), "Dual Lock" (combination ignition switch and mechanical transmission lock).

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-G

Performance Data—Gen. cold. Thermostat closed.					
Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Armature—Delco-Remy, 820985.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 482-F.

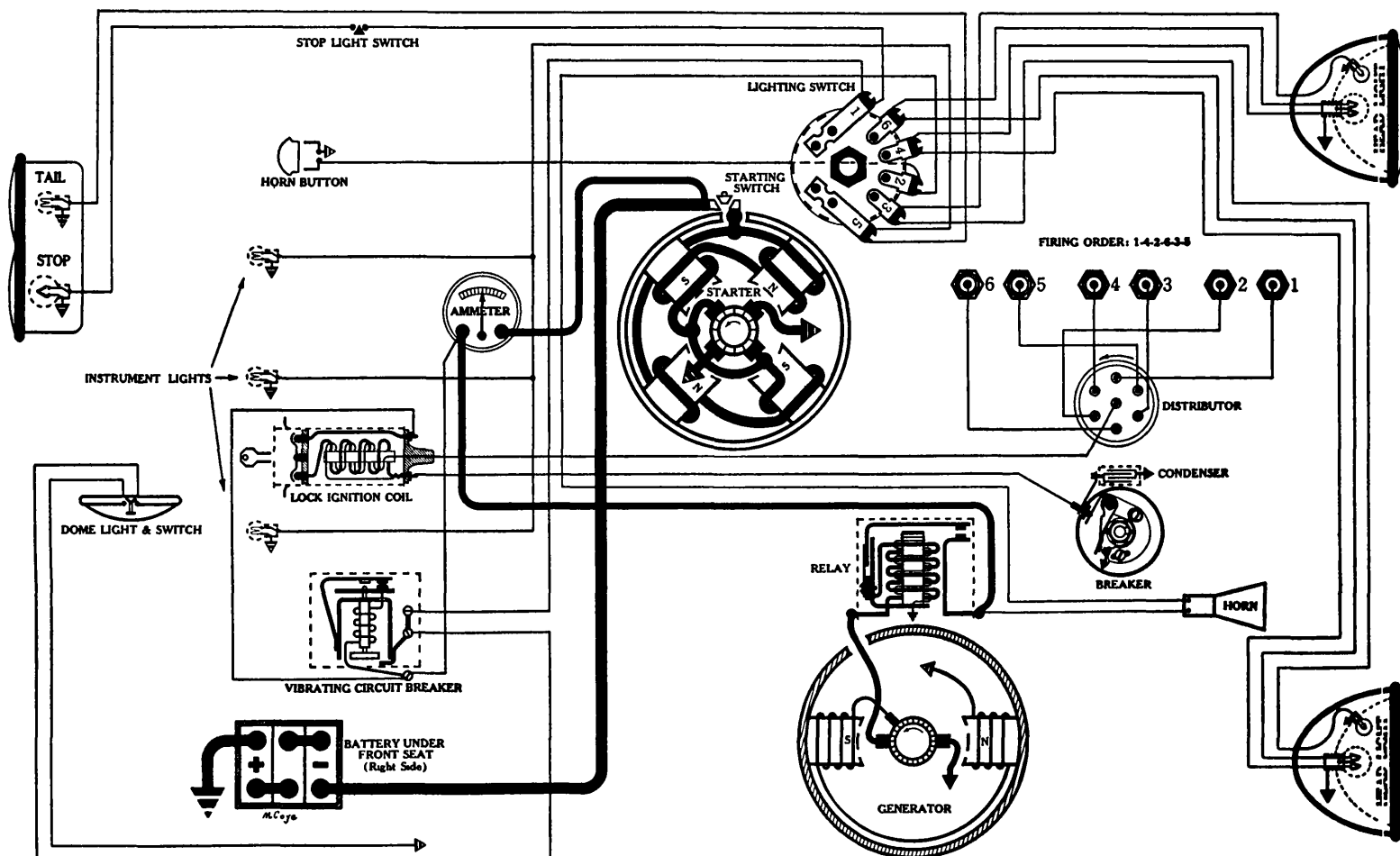
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Three 20 amp. fuses (type 3A-20) mounted on block located behind and above instruments (about center of instrument board).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; CORNER—64; STEP—63; TAIL—63; STOP—87; BACK—87.

STUDEBAKER

Model 53, 6 cyl., (Early 1931)



BATTERY

Willard, WJ-1-11, 6 volts. Positive Terminal Grounded.

Starting Capacity—104 amps. for 20 minutes.

Lighting Capacity—5 amps. for 18 hours.

Box—Length, 9 1/16; width, 7 1/16; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 718-L

Connection to Engine—Bendix Drive.

Running Free—65 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—160 to 175 amps. at 4.3 volts.

Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 1837455. Mounted on starter; operated by pull cable from instrument board.

Armature—Delco-Remy, 820626.

IGNITION

Rotation, L. H., Top View

Delco-Remy, 639-J

Breaker—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz.

Timing—IMPORTANT! Time ignition in full advance position.

With No. 1 piston on compression stroke bring flywheel punch marks (found 1/2 inch before "U.D.C 1-6" flywheel mark) opposite pointer, spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .008 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—3/8 inch (Champion, No. 4); Gap .025 inch.

Firing Order—1-4-2-6-3-5.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—30 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0	300	0
1000	7	500	3 1/2
1400	13	700	6 1/2
1800	20	900	10
2400 (Max.)	30	1200	15

Lock Ignition Coil—Delco-Remy, 533-Y.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 955-U

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	14	1400	7.9
5	800	7.1	16	1600 (Max.)	8.
9	1000	7.5	15	1800	8.
12	1200	7.8			

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—15 to 17 amps. at 6 volts.

Field Test—4 1/4 to 5 amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Armature—Delco-Remy, 821180.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9115.

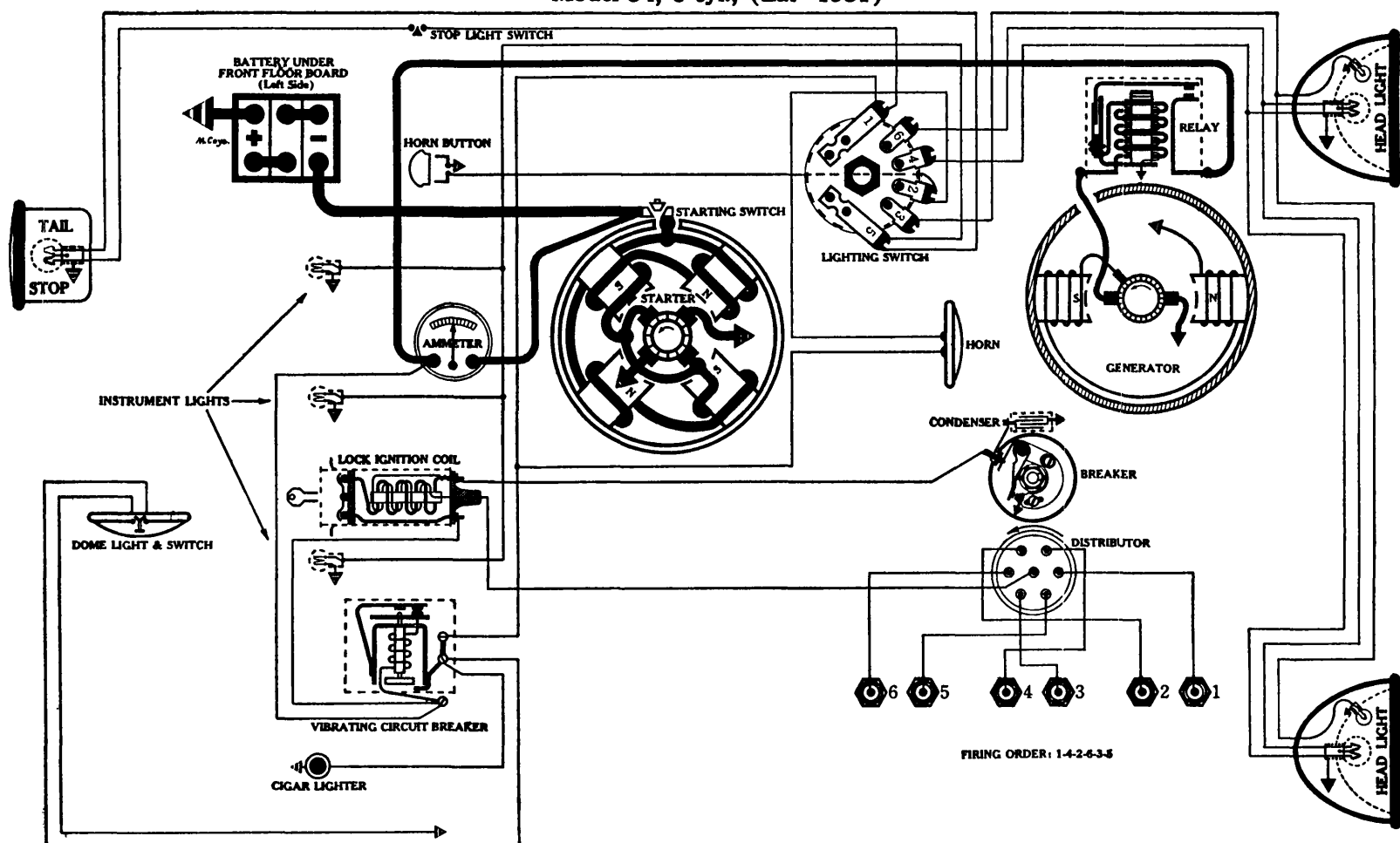
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-J. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

STUDEBAKER

Model 54, 6 cyl., (Lat 1931)



BATTERY

Willard, WJ-1-11, 6 volts. Positive Terminal Grounded.
Starting Capacity—104 amps. for 20 minutes.
Lighting Capacity—5 amps. for 18 hours.
Box—Length, 9 1/16; width, 7 1/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 718-V

Connection to Engine—Bendix Drive.
Running Free—65 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—160 to 175 amps. at 4.3 volts.
Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 1838644. Mounted on starter; operated by pull cable from instrument board.
Armature—Delco-Remy, 820626.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 632-J.

Breaker—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz.
Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke bring flywheel punch marks (found 1/2 inch before "U. D. C. 1-6" flywheel mark) opposite pointer, spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .008 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—3/8 inch regular (Champion, No. 2); Gap .025 inch.
Firing Order—1-4-2-6-3-5.

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0	300	0
1000	7	500	3 1/2
1400	13	700	6 1/2
1800	20	900	10
2400 (Max.)	30	1200	15

Lock Ignition Coil—Delco-Remy, 533-Y.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 943-J, (Belt Drive)

Performance Data—Gen. cold. No thermostat.		
Amps.	R.P.M.	Volts
0	575	6.5
5	850	7.1
12	1250	7.8
16	1650	8.
18	1850 (Max.)	8.2

Motoring Freely—5 to 5 1/2 amps at 6 volts.
Max. Stall Current—16 to 19 amps. at 6 volts.
Field Test—4 1/2 amps. at 6 volts across field coils in series.
Brush Spring Tension—14 to 18 oz. on each.
Armature—Delco-Remy, 817221.
Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-G

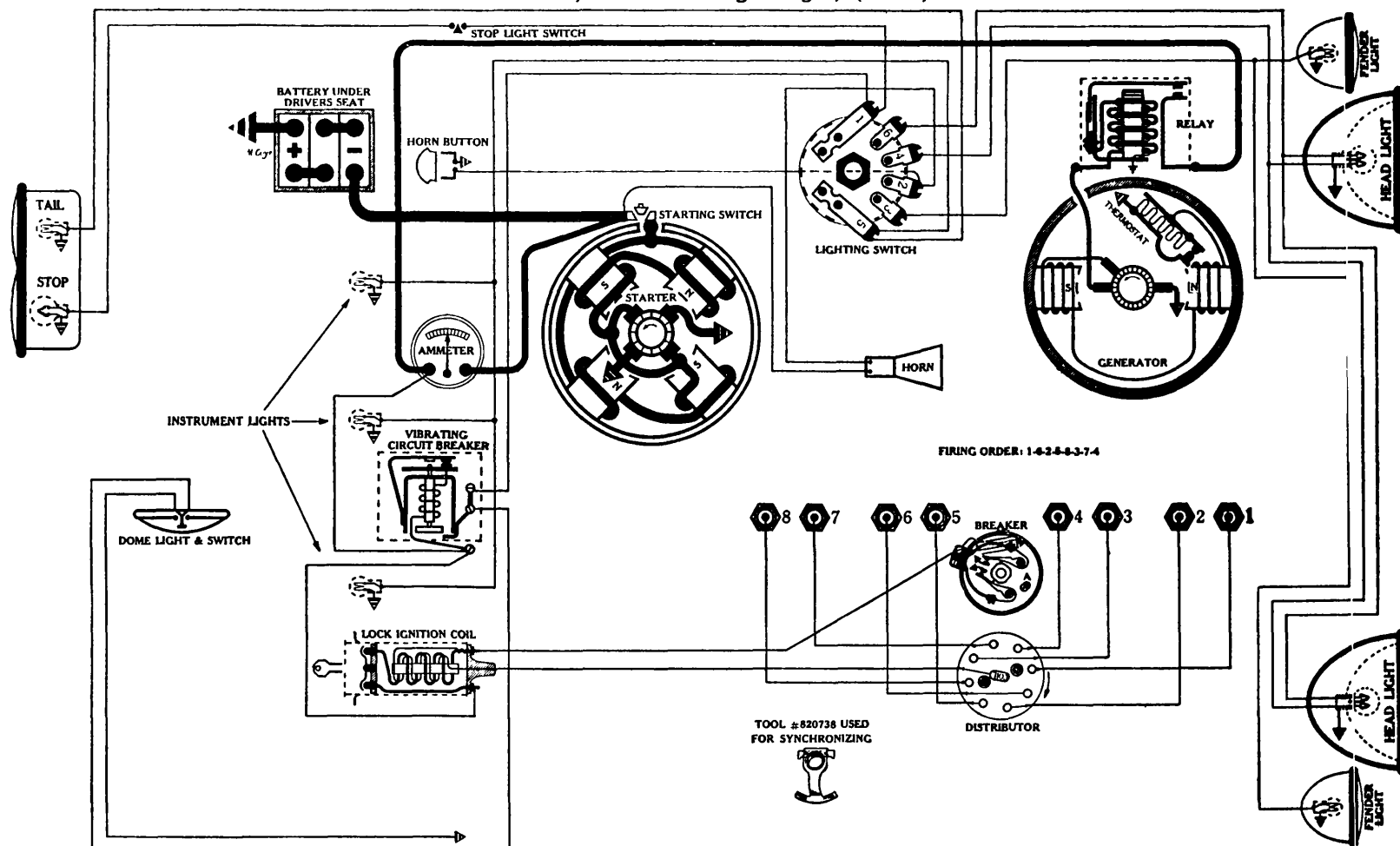
Closes—7 to 7 1/2 volts.
Opens—0 to 2 1/2 amps discharge
Contact Gap—.015 to .025 inch.
Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9115.
Location—Foot of steering column Lights controlled by lever on steering wheel.
Vibrating Circuit Breaker—Delco-Remy, 410-J. Starts 25 to 30 amps. Operates 10 to 15 amps.
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.
NOTE:—This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

STUDEBAKER

Model 61, Dictator Straight Eight, (1931)



BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded.

Starting Capacity—160 amps. for 20 minutes.

Lighting Capacity—5 amps. for 28 hours

Box—Length, 11 11/16; width, 7 1/16; height, 9 5/16 inches

STARTER

Rotation, L. H., Com. End

Delco-Remy, 718-Q

Connection to Engine—Bendix Drive

Running Free—65 amps at 5 volts, 6000 R.P.M.

Cranking Engine—160 to 175 amps at 4.3 volts

Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.

Brush Spring Tension—21 to 28 oz. on each.

Starting Switch—Delco-Remy, 1838644.

Armature—Delco-Remy, 1838663.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 658-Z

Breakers—Contact separation .022 inch

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke bring flywheel punch marks (found 3/4 inch before "U.D.C. 1-8" flywheel mark) directly under pointer in flywheel housing. With spark fully advanced, rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .024 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—3/8 inch (Champion, type C-4); Gap .025 inch

Firing Order—1-6-2-5-8-3-7-4

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0-2	300	0-1
1000	6	500	3
1800	14	900	7
2800 (Max.)	22	1400	11

Lock Ignition Coil—Delco-Remy, 533-Y.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 955-C, (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4¼ to 5½ amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 820370.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9115.

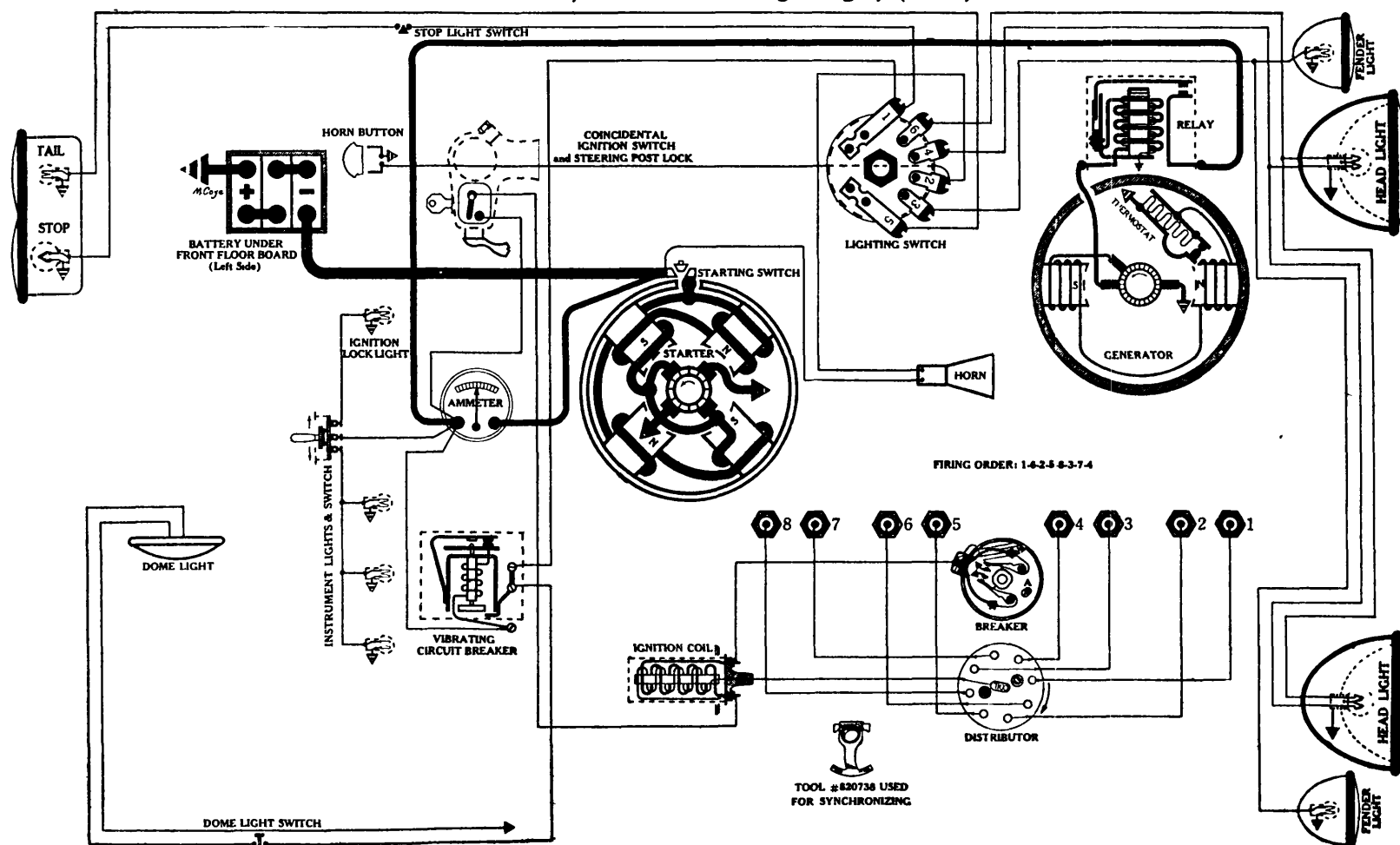
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-J. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

STUDEBAKER

Mod 1 70, Commander Straight Eight, (1931)



BATTERY

Willard, WII-4-17, 6 volts. Positive Terminal Grounded.
Starting Capacity—160 amps. for 20 minutes.
Lighting Capacity—5 amps. for 28 hours
Box—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 718-Q

Connection to Engine—Bendix Drive.
Running Free—65 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—160 to 175 amps. at 4.3 volts.
Lock Torque—15 pound-feet, 570 amps. at 3.1 volts
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 1838644.
Armature—Delco-Remy, 1838663.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 658-L

Breakers—Contact separation .022 inch.
Contact Spring Tension—18 to 20 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing—IMPORTANT! Time ignition in full advance position.
With No. 1 piston on compression stroke bring flywheel punch marks (found 3/4 inch before "U.D.C. 1-3" flywheel mark) directly under pointer in flywheel housing. With spark fully advanced, rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .016 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—3/8 inch regular (Champion, No. 2); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—25 degrees (on Flywheel).
Automatic Advance—22 degrees (on Flywheel).
Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance
(on flywheel) (on cam)
600 - 0-2 - - 300 - - - 0-1
1000 - 6 - - 500 - - - 3
1800 - 14 - - 900 - - - 7
2800 (Max.) 22 - - 1400 - - - 11

Coil—Delco-Remy, 528-E.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-C, (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts
0	575	6.5
3	700	7.
6	800	7.1
11	1000	7.9
15	1200	8.1
20	1450 (Max.)	8.3
19	1700	8.3

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4% to 5½ amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 820370.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9115.

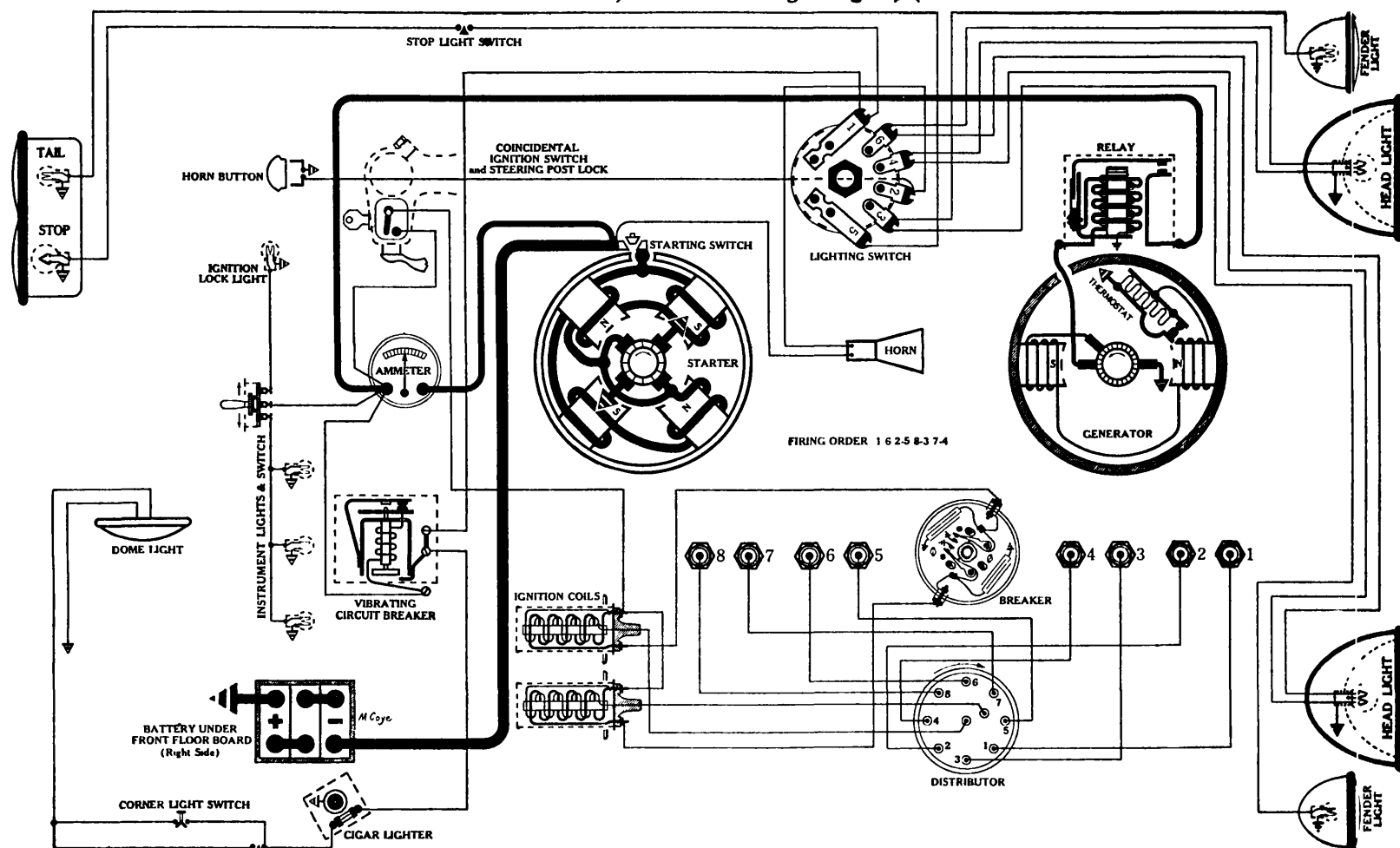
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-J. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

STUDEBAKER

Mod ls 80 and 90, President Straight Eights, (1931)



BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded.
Starting Capacity—160 amps. for 20 minutes
Lighting Capacity—5 amps. for 28 hours
Box—Length, 11 11/16; width, 7 1/16; height, 9 5/16 inches

STARTER

Rotation, R. H., Com. End
Delco-Remy, 728-C

Connection to Engine—Mechanical gear shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on starter. This is a gear reduction job, a pinion being cut on the armature shaft.

Running Free—70 amps. at 5 volts, 2500 R.P.M.
Cranking Engine—150-160 amps. at 4.4 volts.
Lock Torque—28 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 16210.
Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 668-C

Breakers—Contact separation .022 inch.
Contact Spring Tension—18 to 20 oz. on each
Synchronizing—Movable points open 45 degrees after stationary.
Timing—IMPORTANT! Time ignition in full advance position
With No. 1 piston on compression stroke bring flywheel punch marks (found 1 inch before "U.D.C. 1-8" flywheel marks) directly under pointer on right side of flywheel housing. With spark fully advanced, rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .023 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs— $\frac{7}{8}$ inch (Champion, No. 4); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—25 degrees (on Flywheel).

Automatic Advance—19 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0-2	300	0-1
1000	4	500	2
1500	8	750	4
2500	14	1250	7
3200	19	1600	9½

Coils—Delco-Remy, 528-E.

Ignition Switch—Hershey "Coincidental" — Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 927-J, (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	14	1400	7.9
5	800	7.1	16	1600	8.
9	1000	7.5	18-20	1700 (Max.)	8.2
12	1200	7.8			

Motoring Freely—3 to 3½ amps. at 6 volts.

Max. Stall Current—19 to 21 amps. at 6 volts.

Field Test—2 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1839078.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9115.

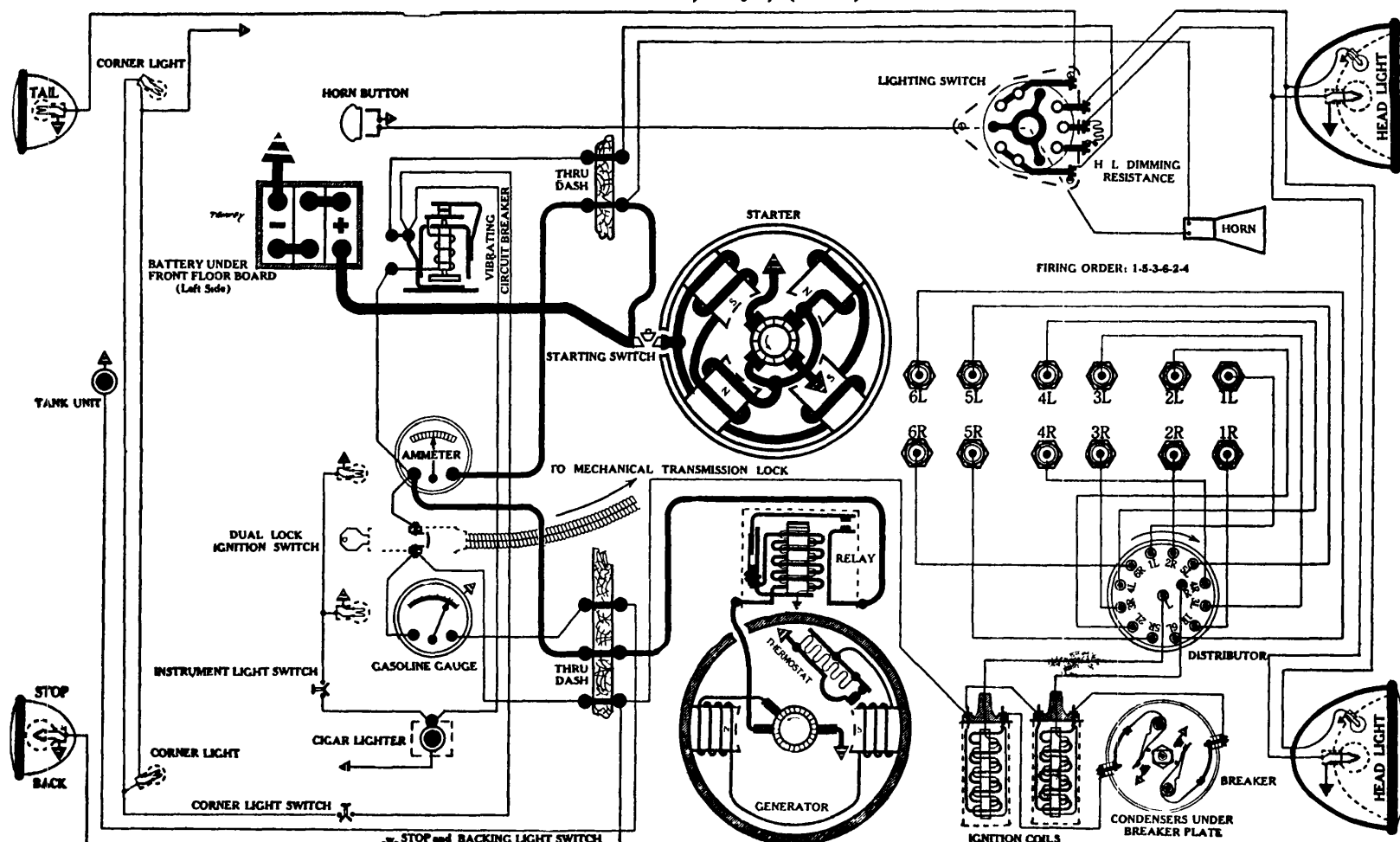
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-J. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

STUTZ

Model LA, 6 cyl., (1931)



BATTERY

Prest-O-Lite, A-6-17-S, 6 volts. Negative Terminal Grounded.
 Starting Capacity—170 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 32 hours.
 Box—Length, 13; width, 7; height, 9 $\frac{1}{2}$ inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 726-C

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—65 amps. at 5 volts, 6000 R.P.M.
 Cranking Engine—160 to 175 amps. at 4.3 volts.
 Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
 Brush Spring Tension—24 to 28 oz. on each.
 Starting Switch—Delco-Remy, 16210.
 Armature—Delco-Remy, 820347.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 4043

IMPORTANT NOTE:—This unit has a six lobe cam with two sets of electrically independent breaker points. Two independent condensers and two coils are used. Points should be adjusted to operate simultaneously.

Breakers—Contact separation .020 inch
 Contact Spring Tension—18 to 20 oz. on each.
 Synchronizing—Adjust both breakers to open simultaneously.
 Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 113 and rod No. 31. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .077 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminals both sets of breaker points should just open.
 Spark Plugs—Metric (Champion, type C-7); Gap .025 inch.
 Firing Order—1-5-3-6-2-4.
 Manual Advance—35 degrees (on Flywheel).
 Automatic Advance—22 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400 -	0 -	200 -	0
800 -	4 -	400 -	2
1200 -	8 -	600 -	4
1600 -	12 -	800 -	6
2000 -	16 -	1000 -	8
2400 -	20 -	1200 -	10
2600 (Max.) -	22 -	1300 -	11

Coils—Delco-Remy, 528-C.

Ignition Switch—Delco-Remy, 426-K "Dual Lock." (Combination Ignition Switch and Mechanical Transmission Lock.)

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 949-H

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0 -	575	6.5	15 -	1200	8.1
8 -	700	7 -	20 -	1450 (Max.)	8.3
6 -	800	7.1	19 -	1700	8.3
11 -	1000	7.9			

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5 $\frac{1}{2}$ amps at 6 volts.

Max. Stall Current—18 to 20 amps at 6 volts.

Field Test—4 $\frac{1}{2}$ to 5 $\frac{1}{2}$ amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 820659.

Third Brush Adjustment—Loosen cover band. See Fig. 22, P. 7, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 $\frac{1}{2}$ volts.

Opens—0 to 2 $\frac{1}{2}$ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-G.

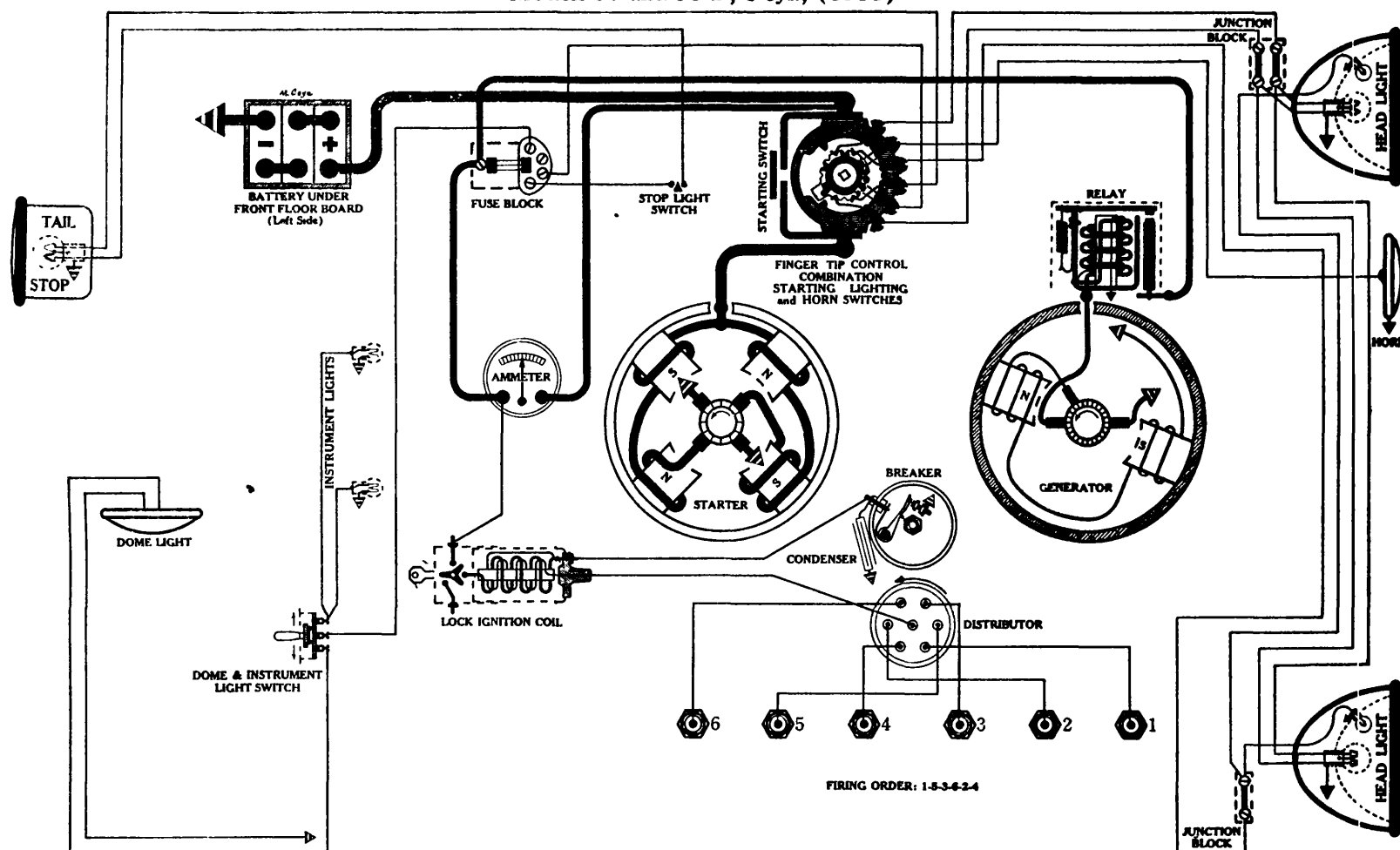
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See P. 3, Sec. AA. HEAD—1129; AUX.—63; INSTRUMENT—63; CORNER—64; TAIL—63; STOP AND BACK—87.

WILLYS

Models 97 and 98-D, 6 cyl., (1931)



BATTERY

U. S. L., XY-13X-7A, 6 volts. Negative Terminal Grounded.
 Starting Capacity—102 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 17½ hours.
 Box—Length, 9 1/16; width, 7¼; height, 9¼ inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MZ-4024

Connection to Engine—Bendix Drive.
 Running Free—47 amps at 5½ volts, 4902 R.P.M.
 Cranking Engine—175 to 185 amps. at 4½ volts.
 Lock Torque—10 pound-feet, 470 amps. at 3½ volts
 Brush Spring Tension—44 to 48 oz. on each.
 Starting Switch—Located foot of steering column. Operated by pulling up on horn button.
 Armature—Auto-Lite, MZ-2082.

IGNITION

Rotation, L. H., Top View
 Auto-Lite, IGB-4032

Breaker—Contact separation .020 inch.
 Contact Spring Tension—17 to 19 oz.
 Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke slowly hand crank engine until flywheel mark "IGN" lines up with pointed end of inspection plate screw. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
 Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (Champion, type C-7); Gap .025 inch.
 Firing Order—1-5-3-6-2-4.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist R.P.M.	Degrees Advance (on cam)
400	0	200	0
800	3	400	15
1200	6	600	3
2000	12	1000	6
2400	16	1200	8
3200 (Max.)	22	1600	11

Lock Ignition Coil—Auto-Lite, IG-4303.

NOTE—This is a new type coil, with but one primary terminal at top, which should always be connected to the breaker. Two other primary terminals are located at base of coil, either one of which may be used for the "hot" feed; the other terminal is for the gas gauge or other auxiliary units.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAL-4331

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0	600	6.3
6	800	6.9
10	1000	7.1
13	1200	7.5
15	1400	7.7
17	1900 (Max.)	8.

Motoring Freely—4½ to 5 amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Field Fuse—(None).

Brush Spring Tension—10 to 13 oz. on each.

Armature—Auto-Lite, GAL-2143.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7½ volts

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Pines Finger Tip Control, No. A-803.

Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.

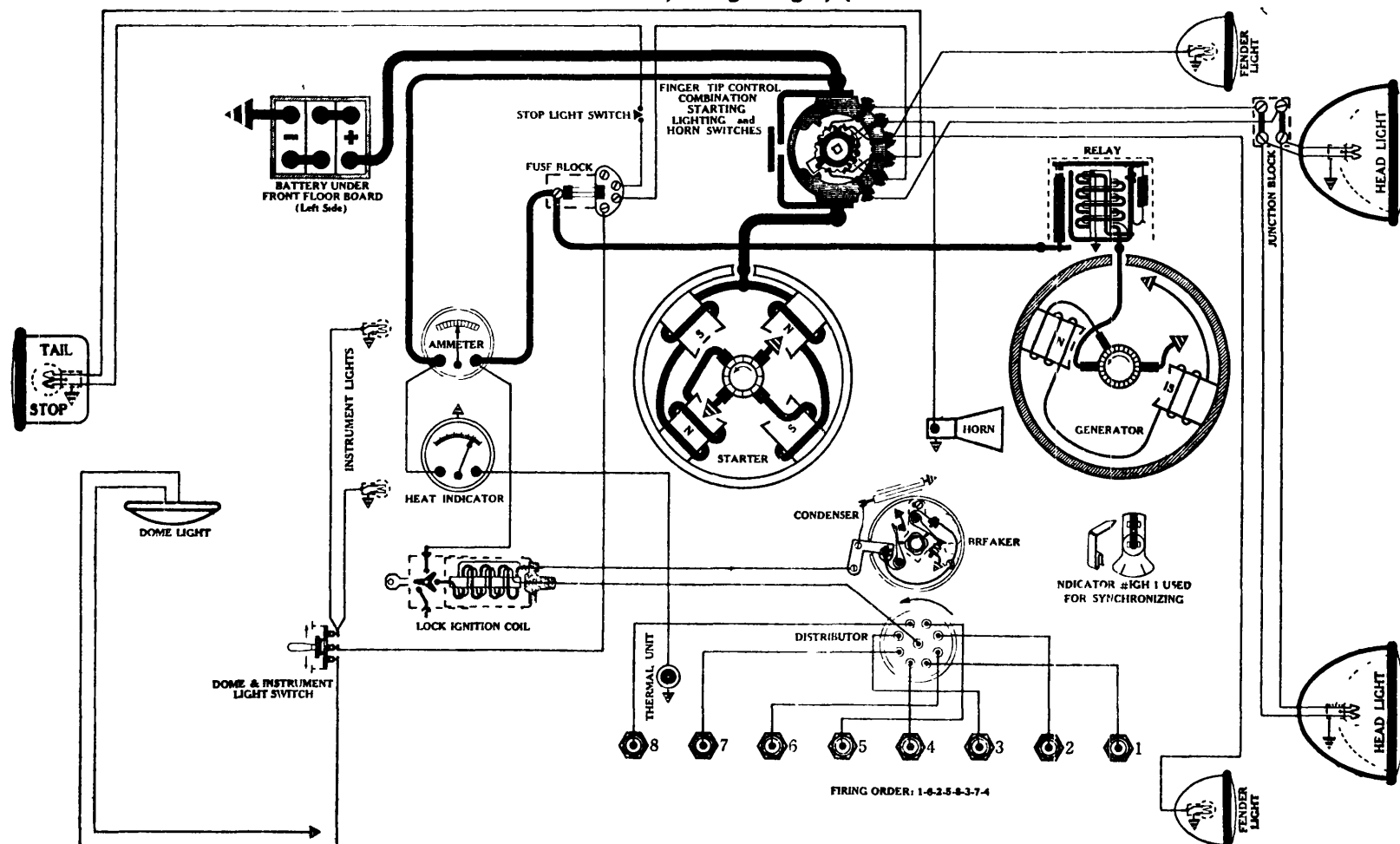
Fuses—Single 20 amp. fuse (type 3A-20), mounted on block under engine hood (left side)

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER OR AUX.—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

NOTE—This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

WILLYS

Model 8-80D, Straight Eight, (1931)



BATTERY

U. S. L., 3-HVX-7X-6A, 6 volts. Negative Terminal Grounded.
Starting Capacity—148 amps. for 20 minutes.
Lighting Capacity—5 amps. for 28 hours.
Box—Length, 11 $\frac{1}{4}$; width, 7 $\frac{7}{16}$; height, 9 $\frac{1}{8}$ inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4035

Connection to Engine—Bendix Drive.
Running Free—46 amps. at 5.5 volts, 4020 R.P.M.
Cranking Engine—160 to 170 amps. at 5 volts.
Lock Torque—17 pound-feet, 520 amps. at 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Located foot of steering column. Operated by pulling up on horn button.
Armature—Auto-Lite, MAB-2098.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGH-4013

Breakers—Contact separation .018 inch.
Contact Spring Tension—17 to 19 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke slowly hand crank engine until flywheel mark "IGN" lines up with pointed end of inspection plate screw. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 40. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .014 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (Champion No. 7); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel).

Eng. R P.M.	Degrees Advance (on flywheel)	Dist. R P.M.	Degrees Advance (on cam)
400	0	200	0
1200	6	600	3
2000	13	1000	6 $\frac{1}{2}$
3000	19	1500	9 $\frac{1}{2}$
3400 (Max.)	22	1700	11

Lock Ignition Coil—Auto-Lite, IG-4303.

NOTE:—This is a new type coil, with but one primary terminal at top, which should always be connected to the breaker. Two other primary terminals are located at base of coil, either one of which may be used for the "hot" feed; the other terminal is for the gas gauge or other auxiliary units.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4331

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0	600	6.3
6	800	6.9
10	1000	7.1
13	1200	7.5
15	1400	7.7
17	1900 (Max.)	8.

Motoring Freely—4 $\frac{1}{2}$ to 5 amps at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—4 $\frac{1}{2}$ amps. at 6 volts across field coils in series.

Field Fuse—(None).

Brush Spring Tension—10 to 13 oz. on each.

Armature—Auto-Lite, GAL-2147.

Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 $\frac{1}{2}$ volts.

Opens— $\frac{1}{2}$ to 2 $\frac{1}{2}$ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Pines Finger Tip Control, No. A-803.

Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.

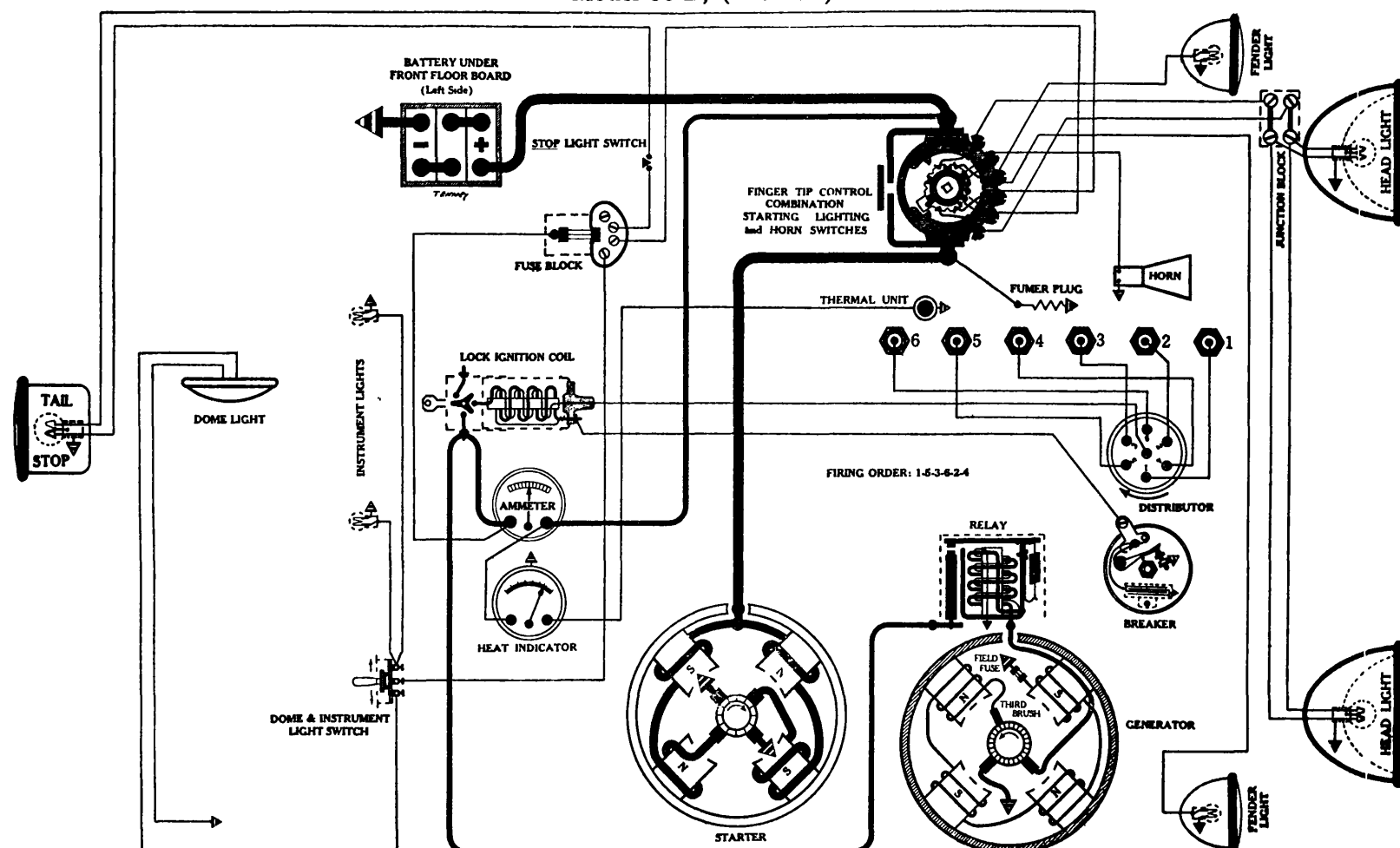
Fuses—Single 20 amp. fuse (type 3A 20), mounted on block under engine hood (left side).

Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

NOTE:—This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

WILLYS-KNIGHT

Model 66-D, (1931-32)



BATTERY

U. S. L., 3-IVX-8X-7A, 6 volts. Negative Terminal Grounded.
Starting Capacity—170 amps. for 20 minutes.
Lighting Capacity—5 amps. for 33 hours.
Box—Length, 13 1/16; width, 7 7/16; height, 9 3/4 inches.

STARTER

Rotation, R. H., Com. End
 Auto-Lite, MAB-4018

Connection to Engine—Bendix Drive.
Running Free—46 amps. at 5.5 volts, 4020 R.P.M.
Cranking Engine—160 to 170 amps. at 5 volts.
Lock Torque—17 pound-feet, 520 amps. at 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Located foot of steering column. Operated by pulling up on horn button.
Armature—Auto-Lite, MAB-2046.

IGNITION

Rotation, R. H., Top View
 Auto-Lite, IGC-4052

Breakers—Contact separation .020 inch.
Contact Spring Tension—17 to 19 oz. on each.
Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke slowly hand crank engine until flywheel mark "IGN" (which is 16 degrees, or 1-29/32 inch on flywheel, before T.D.C.) is opposite pointed end of inspection plate screw. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 100 and rod No. 6. Slowly hand crank engine until No. 1 piston is coming up on compression stroke. Stop when .062 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—3/8 inch (Champion, type C-4); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Manual Advance—20 degrees (on Flywheel).
Automatic Advance—21 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	0	200	0
1200	6	600	3
2000	10	1000	5
2400	14	1200	7
3400 (Max.)	21	1700	10 1/2

Lock Ignition Coil—Auto-Lite, IG-4303.

NOTE—This is a new type coil, with but one primary terminal at top, which should always be connected to the breaker. Two other primary terminals are located at base of coil, either one of which may be used for the "hot" feed; the other terminal is for the gas gauge or other auxiliary units.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAG-4130

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0	525	6.5
2	550	6.6
5	650	7.
10	780	7.3
14	1200	7.7
17	1250 (Max.)	8.

Motoring Freely—4 1/2 to 5 amps. at 6 volts.
Max. Stall Current—17 to 19 amps. at 6 volts.
Field Test—4 amps. at 6 volts across field coils in series.
Field Fuse—7 1/2 amps. (type 1A-7 1/2).
Brush Spring Tension—22 to 27 oz. on each.
Armature—Auto-Lite, GAG-2075.
Third Brush Adjustment—Loosen cover band. See Fig. 13, P. 7, Sec. AA.

RELAY

Auto-Lite, CB-4014

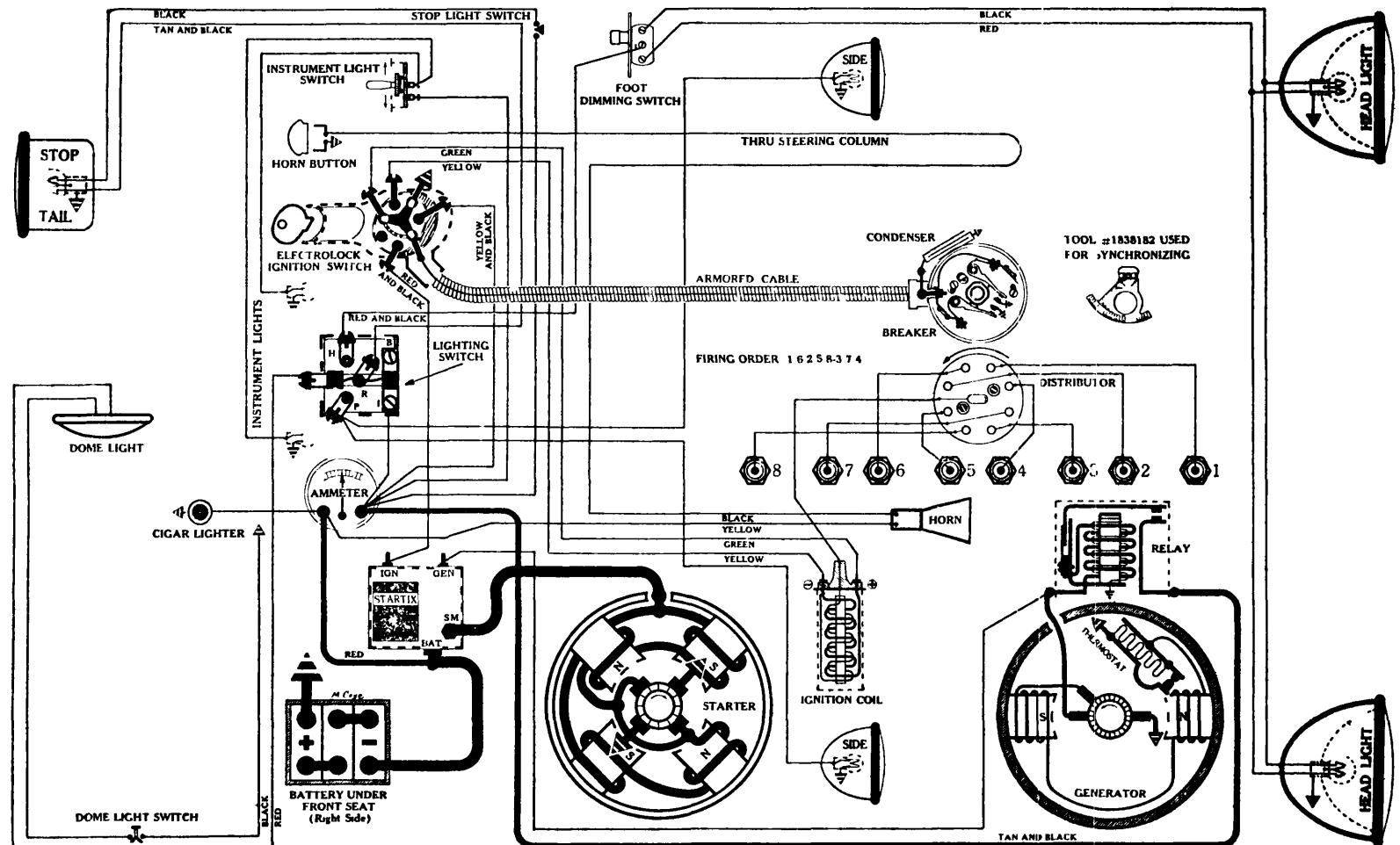
Closes—7 to 7 1/2 volts.
Opens—1/2 to 2 1/2 amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Pines Finger Tip Control, No. A-803.
Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.
Fuses—Single 20 amp. fuse (type 3A-20), mounted on block under engine hood (left side).
Lamps—See P. 3, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.
NOTE—This is the old style Ford headlight bulb with two filaments. Make sure the 3 C.P. filament burns for tail light.

AUBURN

Model 8-100, Straight Eight, (1932)



BATTERY

U. S. L., XY-15X-7A, 6 volts. Positive Terminal Grounded
 Starting Capacity—119 amps. for 20 minutes.
 Lighting Capacity—5.7 amps. for 20 hours.
 Box—Length, 10 1/4; width, 7 1/4; height, 8 3/8 inches.

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 722-Q

Connection to Engine—Bendix Drive.

NOTE: This is a gear reduction starter.

Running Free—65 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—175 to 185 amps. at 4 1/2 volts.

Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device, manufactured by the Eclipse Machine Corp., Elmira, N. Y. For complete details of operation and instructions on servicing see Sec. AA.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, L. H., Top View
 Delco-Remy, 660-Z

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary. Timing—IMPORTANT! Time ignition in full advance position.

Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when 12 1/2 degrees, or 3 1/4 teeth ahead of T. D. C. (for engines with standard compression heads), or 8 1/2 degrees which corresponds to 2 1/4 teeth (for high compression heads). With rotor opposite No. 1 Dist. Cap Terminal, stationary breaker points should just open.

Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .060 inch before T. D. C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal stationary set of breaker points should just open.

Spark Plugs—3/8 inch (Champion No. 2); Gap .026 to .028 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—26 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
500	Start	250	Start
800	4	400	2
1600	14	800	7
2400	24	1200	12
2600 (Max.)	26	1300	13

Ignition Coil—Delco-Remy, 528-C.

Ignition Switch—"Electrolock", type 15-S. NOTE: This is a new type, three position ignition switch, designed especially for use on "Startix" equipped cars. When key is turned to left (emergency position), the ignition circuit is completed but the automatic starting device is inactive.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy 955-H (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.1	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE: Thermostat opens about 16 1/2° F., reducing charging rate approx. 30-40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Armature—Delco-Remy, 819976

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5670-A.

Location—Behind instrument board. Operated by pull knob.

Fuses—Single 20 amp. use (type 3A-20) mounted on switch back. Spare fuse in clip on switch support.

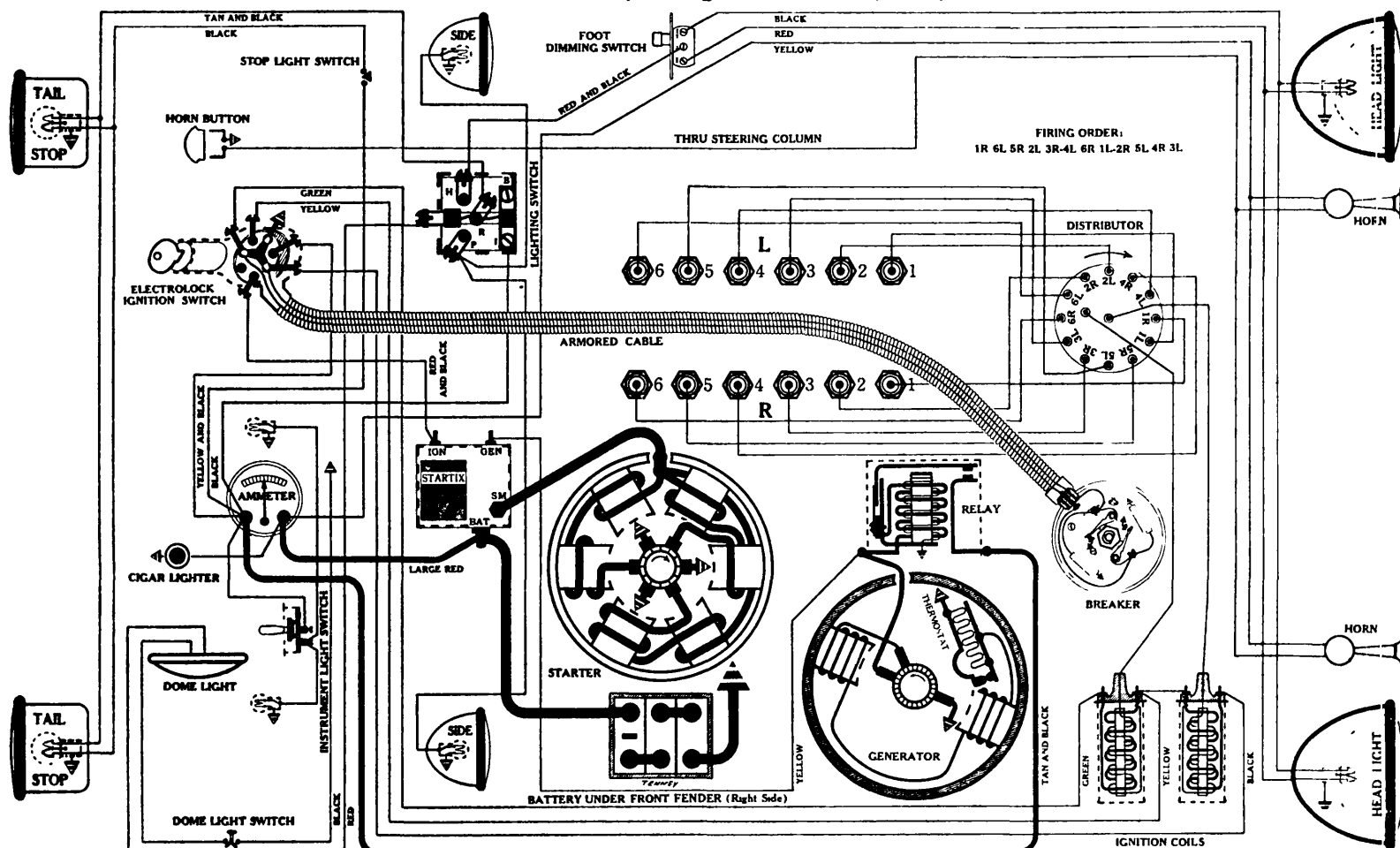
Foot Dimming Switch—Delco-Remy, 465-K or 465-W.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); SIDE—81; INSTRUMENT—63; DOME—81; COWL—63; STOP AND TAIL—1158.

AUBURN

Model 12-160, 45 degree "Vee" 12 (1932)



BATTERY

U.S.L., XY-17-A, 6 volts. Positive Terminal Grounded
Starting Capacity—136 amps. for 20 minutes.
Lighting Capacity—6.6 amps. for 20 hours.
Box—Length, 11½; width, 7¼; height, 8½ inches.

STARTER

Rotation, R. H., Com. End.

Delco-Remy, 543

Connection to Engine—Bendix Drive.

Running Free—70 amps. at 5½ volts, 2200 R.P.M.

Cranking Engine—265 to 280 amps. at 4 volts.

Lock Torque—35 pound-feet, 600 amps, at 3 volts.

Brush Spring Tension—36 to 40 oz. on each.

Starting Switch—"Startix," type D, Automatic Starting Switch and Anti-Stall Device, manufactured by the Eclipse Machine Corp., Elmira, N. Y. For complete details of operation and instructions on servicing see Sec. AA.

Armature—Delco-Remy, 1837058.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 667-Z

Breakers—Contact separation .018 inch.

NOTE:—Due to the peculiar design of the ignition cam, to insure good high speed performance the contact separation must be accurately adjusted to .018 inch and no more.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 22½ degrees after stationary. Unequal intervals of 22½-37½-22½, etc. degrees between interruptions.

Timing—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug from left cylinder block, and turn crankshaft (no provision made for hand cranking; place transmission in high, jack up rear wheel), until No. 1 piston, left block, is coming up on compression stroke. Stop when flywheel mark "DC-1 & 6 L" is 3½ teeth (equivalent to 10°) ahead of pointer on housing. With end of rotor which distributes current from center of cap, opposite No. 1L distributor cap outlet, movable set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1L spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 19. Slowly turn engine (by rear wheel) until No. 1L piston is coming up on compression stroke. Stop when .039 inch before T.D.C., as indicated on gauge. With spark in full advance position movable set of breaker points should just open.

Spark Plugs—Metric (Champion, type C-7); Gap .025 inch.

Firing Order—1R-6L-5R-2L-3R-4L-6R-1L-2R-5L-4R-3L.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance (on flywheel)

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1800	10	900	5
2500	16	1250	8
3200 (Max.)	20	1600	10

Ignition Coils—Delco-Remy, 528-C.

Ignition Switch—Electrolock, type 15-SD. NOTE: This is a new type, three position ignition switch, designed especially for use on dual coil "Startix" equipped cars. When key is turned to left (emergency position), the ignition circuit is completed but the automatic starting device is inactive.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 931-E

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	400	6.4	16	720	7.8
4	460	6.7	20	840	8.
8	520	7.	24	1400 (Max.)	8.4
12	600	7.4			

NOTE—Thermostat opens about 165° F., reducing charging rate approx 30 to 40%.

Motoring Freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5½ volts.

Field Test—3½ amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1844199.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5670-A.

Location—Behind instrument board. Operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back.

Spare fuse in clip on switch support.

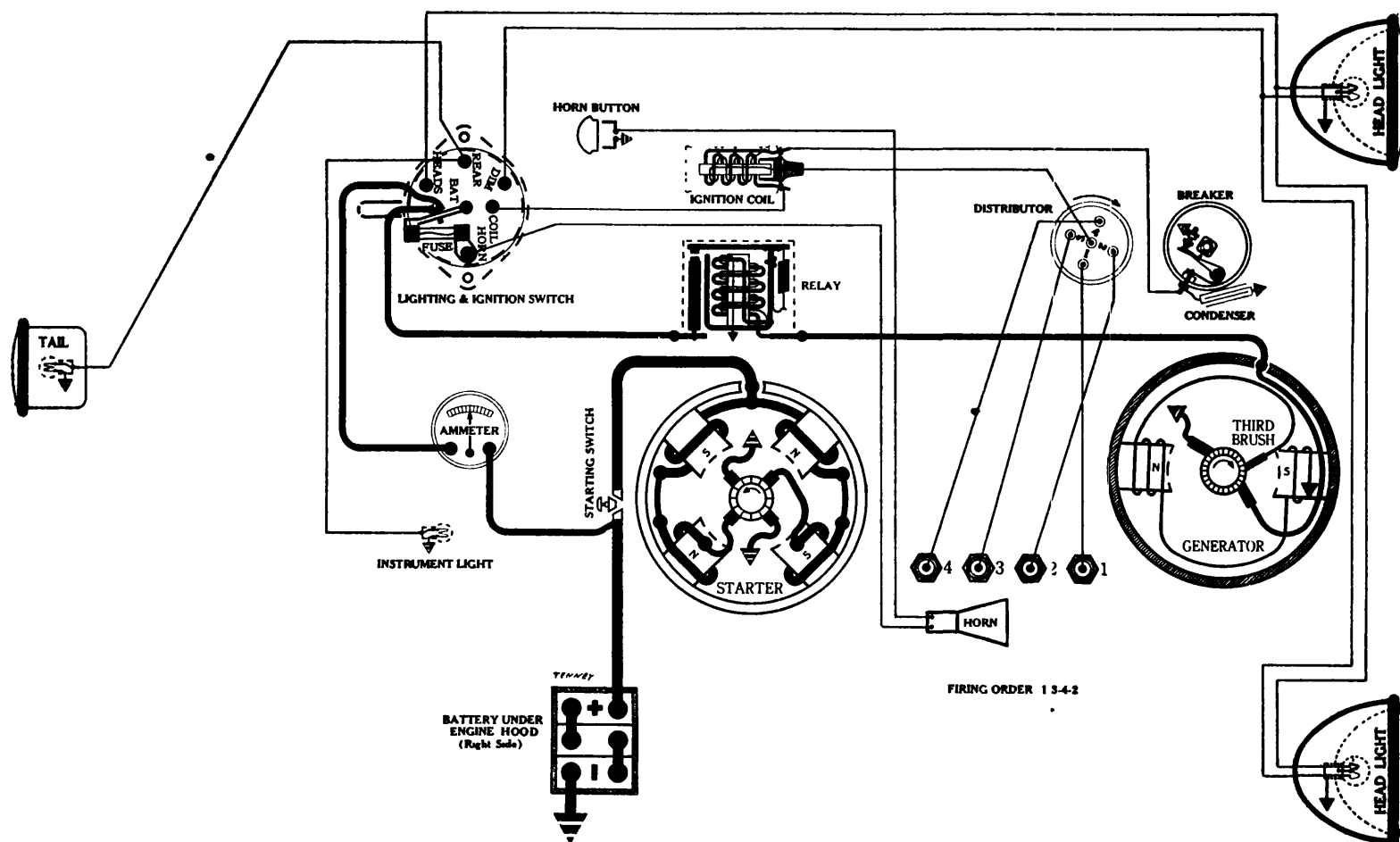
Foot Dimming Switch—Delco-Remy, 465-W or 465-Z.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); SIDE—81; INSTRUMENT—63; DOME—81; COWL—63; STOP AND TAIL—1158.

AUSTIN

Model, 4 cyl., (1932-33)



BATTERY

U. S. L., XY-9A, 6 volts. Negative Terminal Grounded
Starting Capacity—68 amps. for 20 minutes.
Lighting Capacity—2.7 amps. for 20 hours.
Box—Length, 6-15/16; width, 7; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAK-4001

Connection to Engine—Special Bendix Drive, type RCE-11-10T. For details of operation, and instructions on assembling refer to Section AA.

Running Free—35 amps. at 5 1/2 volts.
Cranking Engine—130 amps. at 4.3 volts.
Lock Torque—7 pound-feet, 520 amps., 4 volts.
Brush Spring Tension—30 to 36 oz. on each.
Starting Switch—Auto-Lite, SW-4204.
Armature—Auto-Lite, MAK-2006.

IGNITION

Rotation, R. H., Top View
 Auto-Lite, IGB-4034-A
 (Full Automatic Spark Advance)

Breaker—Contact separation .020 inch
Contact Spring Tension—17 to 19 oz.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 8. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .020 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—Metric (Champion No. 10); Gap .030 inch.
Firing Order—1-3-4-2.

Automatic Advance—22 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	0	300	0
1000	4	500	2
1400	8	700	4
1800	12	900	6
2200	16	1100	8
2600	20	1300	10
2800 (Max.)	22	1400	11

Coil—Auto-Lite, IG-4065.

GENERATOR

Rotation, R. H., Com. End
 Auto-Lite, GAS-4101

Performance Data—Gen. cold.					
Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	825	6.4	12	1800	7.7
3	1000	6.8	14	2400 (Max.)	8.
6	1200	7.	14	2800	8.
9	1400	7.4			

Motoring Freely—6 1/2 amps. at 6 volts (with Distributor); 4 1/2 amps. at 6 volts (without Distributor).

Max. Stall Current—29 amps. at 6 volts.

Field Test—3.8 amps. at 6 volts across field coils in series.

Field Fuse—(None).

Brush Spring Tension—15 to 20 oz. on each.

Armature—Auto-Lite, GAS-3006.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014

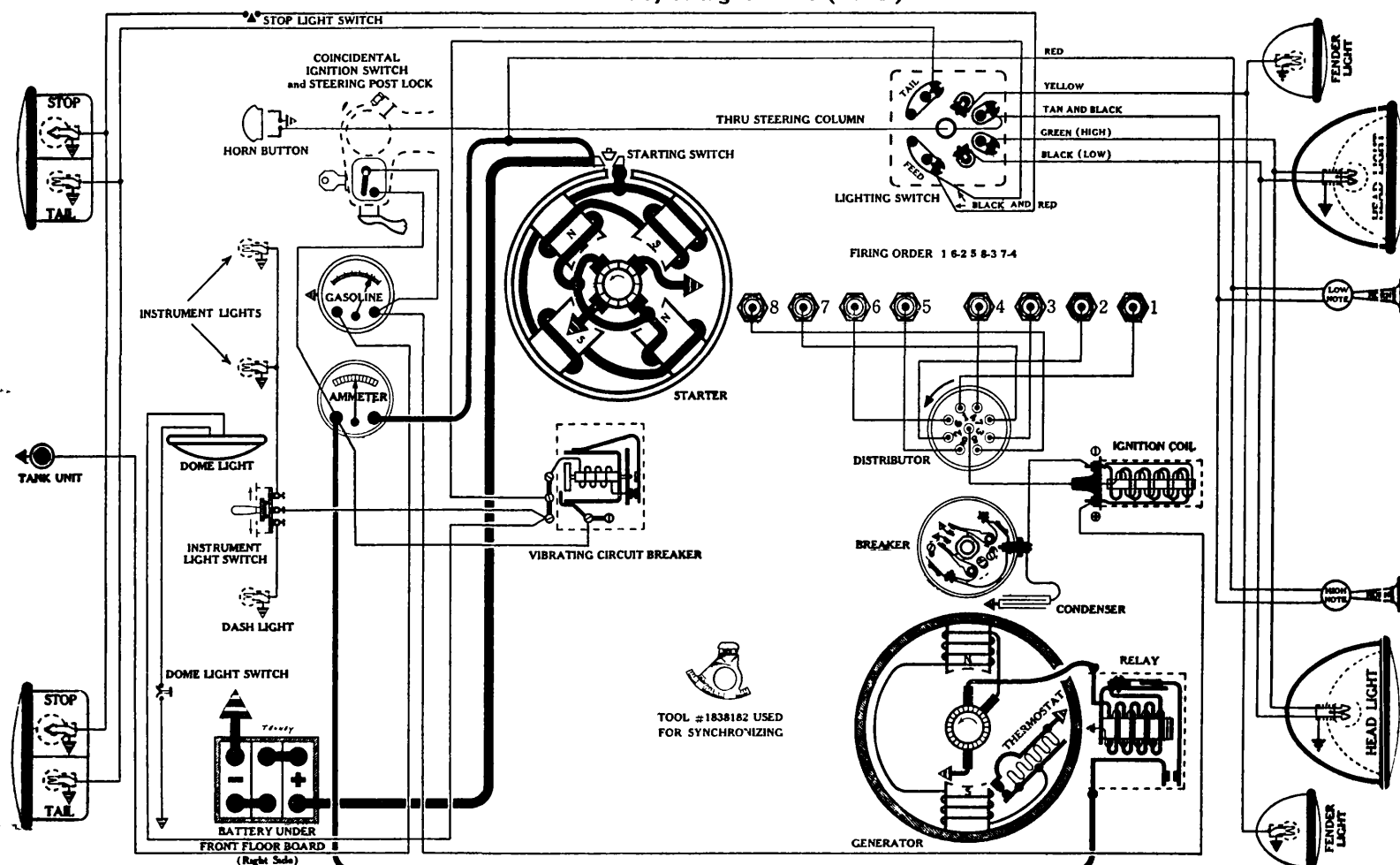
Closes—7 to 7 1/2 volts.
Opens—1/2 to 1 1/2 amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton No. 50518, Combination Lighting and Ignition.
Location—On instrument board.
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch back.
Lamps—See Lamp Table, Sec. AA. **HEAD**—1158; **INSTRUMENT**—63; **TAIL**—63.

BUICK

Model 32-50, Straight Eight (1932)



BATTERY

Delco-Remy, 13-E, 6 volts. Negative Terminal Grounded
 Starting Capacity—117 amps. for 20 minutes.
 Lighting Capacity—4.9 amps. for 20 hours.
 Box—Length, 9-1/16; width, 7; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 725-T

Connection to Engine—Mechanical Gear Shift incorporating over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps, at 5 volts, 6000 R.P.M.
 Cranking Engine—165 to 185 amps. at 4.2 volts.
 Lock Torque—15 pound-feet, 600 amps. at 3 volts.
 Brush Spring Tension—24 to 28 oz. on each.
 Starting Switch—Delco-Remy, 820052.
 Armature—Delco-Remy, 823381.

IGNITION

Rotation, L. H., Top View
 Delco-Remy, 660-L

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—IMPORTANT! Time ignition in full advance position
 With No. 1 piston on compression stroke, flywheel mark "Adv" (which is 7 degrees before T.D.C.) opposite index line, spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal; stationary breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 31. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .020 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (AC type J-12, low compression); Gap .025 to .030 inch. Metric (AC type H-9, high compression); Gap .020 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—24 degrees (on Flywheel).

Automatic Advance—21 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
500	Start	250	Start
800	12	400	6
1000	14	500	7
1200	16	600	8
1600 (Max.)	21	800	10 1/2

Ignition Coil—Delco-Remy, 528-H.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 940-T

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	580	6.4	12	1000	7.7
5	700	6.9	15	1200	7.9
10	900	7.5	18-20	1500 (Max.)	8.3

NOTE—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—6 amps. at 6 volts (without distributor).

Max. Stall Current—20 amps. at 6 volts.

Field Test—4 3/4 to 5 1/2 amps. at 6 volts, across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1837906.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-X. (Not interchangeable with 1931 switches)

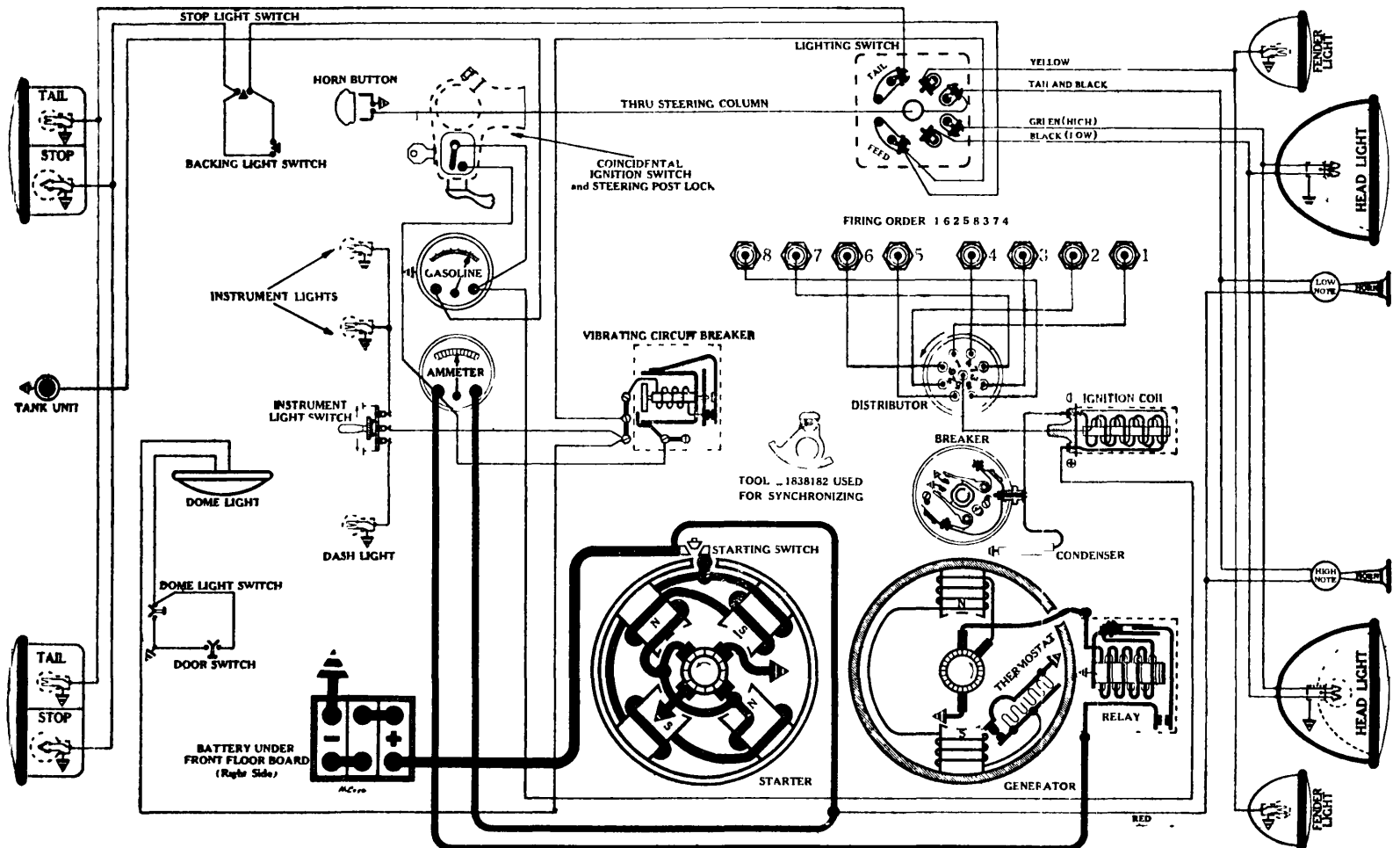
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-K. Starts to operate on discharge of 30 to 35 amps., and limits current to 18 amps. maximum.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; TAIL—63; STOP—87; INSTRUMENT AND DASH—63; DOME—81; TONNEAU—63.

BUICK

Models 32-60, 32-80, 32-90, Straight Eights, (1932)



BATTERIES

MODEL 32-60:—

Delco-Remy, 15-C, 6 volts. Negative Terminal Grounded

Starting Capacity—137 amps. for 20 minutes.

Lighting Capacity—5.7 amps. for 20 hours.

Box—Length, 10-9/32; width, 7; height, 9 1/2 inches.

MODELS 32-80 and 32-90:—

Delco-Remy, 17-B, 6 volts. Negative Terminal Grounded

Starting Capacity—156 amps. for 20 minutes.

Lighting Capacity—6.6 amps. for 20 hours.

Box—Length, 11 1/4; width, 7; height, 9 1/2 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 725-S

Connection to Engine—Mechanical Gear Shift incorporating over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—165 to 185 amps. at 4.2 volts.

Lock Torque—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 820158.

IGNITION

Rotation, L. H., Top View

Delco-Remy, 662-B

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke, flywheel mark "Adv." (which, on Model 32-60 is 11 degrees, and on Models 32-80 and 32-90, 10 degrees before T.D.C.) opposite index line, spark fully advanced rotor opposite No. 1 Dist. Cap Terminal; stationary breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 31. Slowly turn engine until No. 1 piston is coming up on compression stroke. On Model 32-60 stop when .044 inch, and on Models 32-80 and 32-90, when .038 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (AC type J-12, low compression); Gap .025 to .030 inch. Metric (AC type H-9, high compression); Gap .020 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—24 degrees (on Flywheel).

Automatic Advance—30 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on fly wheel)	Dist. R.P.M.	Degrees Advance (on cam)
500	Start	250	Start
800	14	400	7
1400	18	700	9
2400	28	1200	14
2600 (Max.)	30	1300	15

Ignition Coil—Delco-Remy, 528-H.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 940-T

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	580	6.4	12	1000	7.7
5	700	6.9	15	1200	7.9
10	900	7.5	18-20	1500 (Max.)	8.3

NOTE Thermostat opens about 165° F., reducing charging rate approx 30-40%.

Motoring Freely—6 amps. at 6 volts (without distributor).

Max. Stall Current—20 amps. at 6 volts.

Field Test—4 1/4 to 5 1/2 amps. at 6 volts, across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1837906.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-X. (Not interchangeable with 1931 switches.)

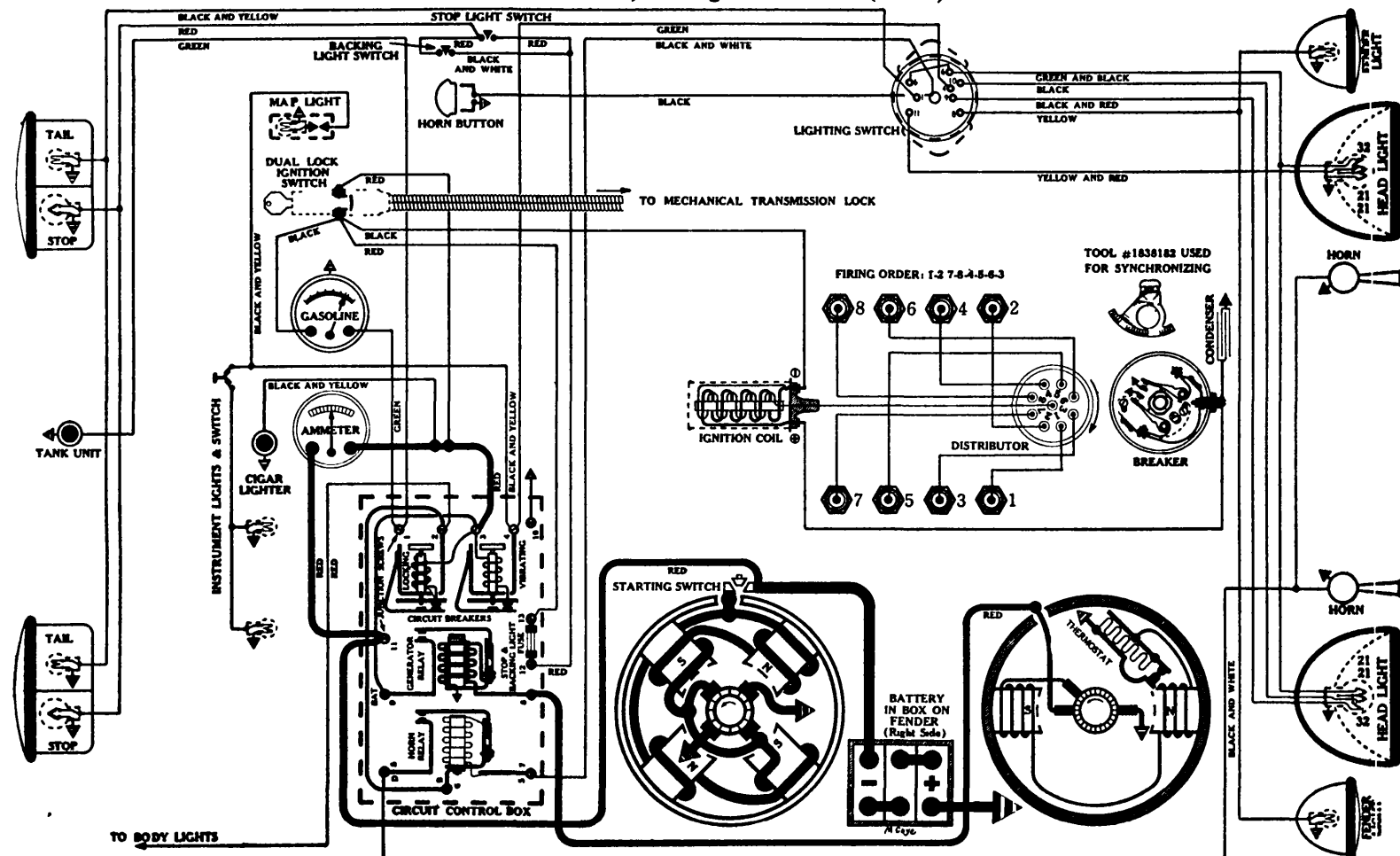
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-K. Starts to operate on discharge of 30 to 35 amps., and limits current to 18 amps. maximum.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; TAIL—63; STOP—87; INSTRUMENT AND DASH—63; DOME—81; TONNEAU—63.

CADILLAC

Model 355-B, 90 degree "Vee" 8 (1932)



BATTERY

Delco-Remy, 17-B, 6 volts. Positive Terminal Grounded
Starting Capacity—137 amps. for 20 minutes.
Lighting Capacity—6.5 amps. for 20 hours.
Box—Length, 11¼; width, 7; height, 9¼ inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 728-P

Connection to Engine—Mechanical gear shift, incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter. Gear reduction job.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—245 to 260 amps. at 4 volts.

Lock Torque—28 pound-feet, 600 amps at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 818134.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-S (Air Cooled)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	450	6.4	16	720	7.8
4	500	6.7	20	840	8.
8	540	7.	24	1400 (Max.)	8.4
12	600	7.4			

NOTE—Thermostat opens about 165° F., reducing charging rate approx 30 to 40%.

Motoring Freely—4½ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 6 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1843113.

Third Brush Adjustment—Loosen cover band. Loosen long hexagonal screw which releases third brush mounting plate, shift brush by hand; relock.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 660-Y

(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Equal 45 degree intervals between interruptions.

Timing—With No. 1 piston on compression stroke, flywheel mark "IG-A" (which is 1-3/16 inches ahead of T.D.C.) opposite indicator, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 29. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .031 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal stationary set of breaker points should just open.

Spark Plugs—Metric (AC type D-8); Gap .025 to .028 inch.

Firing Order—1-2-7-8-4-5-6-3.

NOTE—All odd cylinder numbers on right bank, No 1 nearest radiator, All even numbers on left bank (see diagram)

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
500	Start	250	Start
1000	4	500	2
1500	8	750	4
2200	14	1100	7
2700	18	1350	9
2950 (Max.)	20	1475	10

Ignition Coil—Delco-Remy, 528-G.

Ignition Switch—Delco-Remy, 426-T "Dual Lock." (Combination Ignition Switch and Mechanical Transmission Lock.)

RELAY

Located in Delco-Remy, 480-Z Circuit Control Box
(together with Circuit Breakers and Horn Relay).
Mounted on Dash under Cowl

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-S.

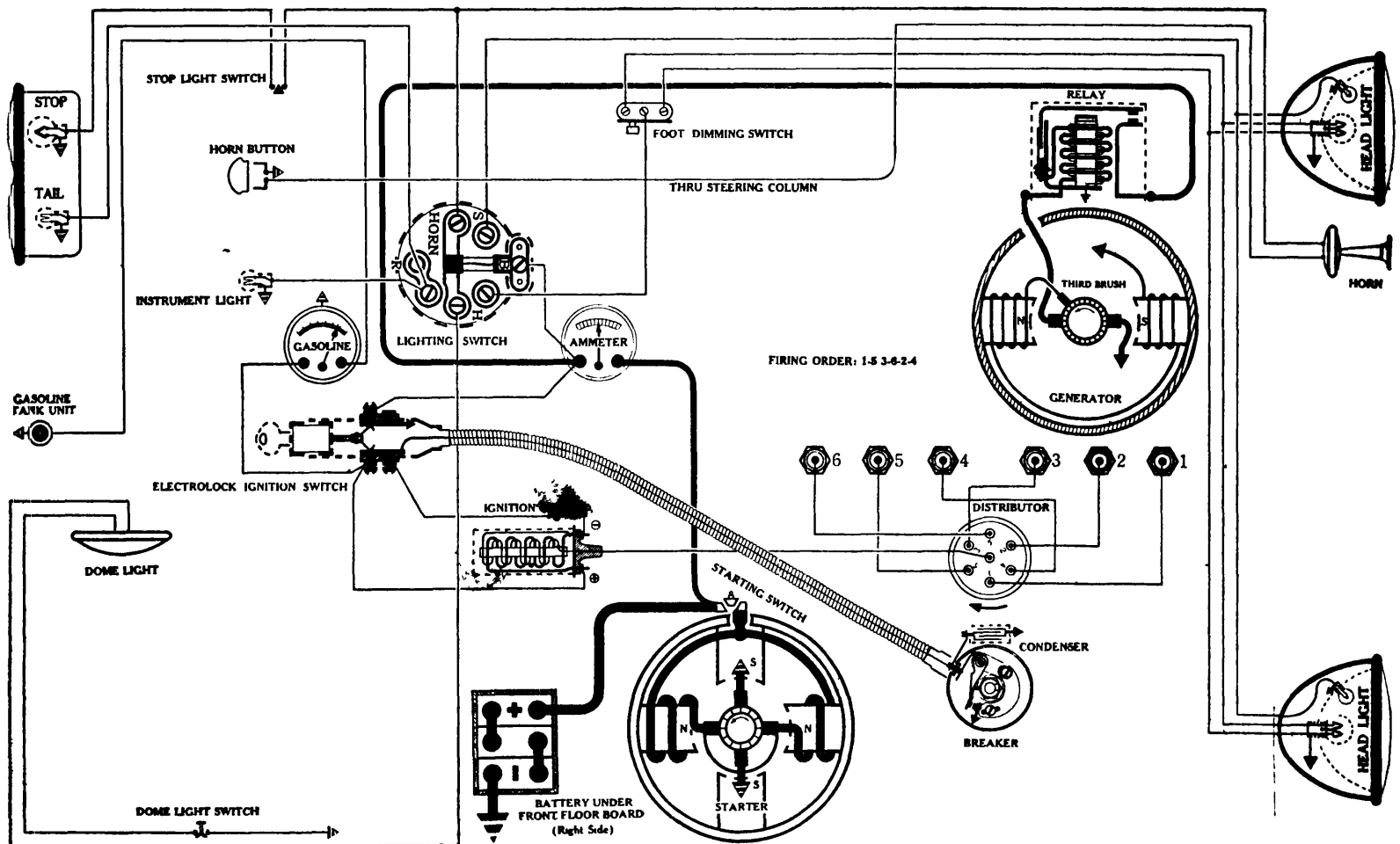
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Circuit Breakers—Vibrating unit—Starts 35 to 40 amps. Operates 5 to 15 amps Lock-out unit—Opens 25 to 30 amps. Operates with discharge less than 1 amp.

Lamps—See Lamp Table, Sec. AA. HEAD—3001 (new type, "Super-Safe" bulb; for complete information see "Super-Safe" Headlight page, Sec. AA.); FENDER—63; INSTRUMENT—63; MAP LIGHT—63; CORNER—81; DOME—81; TAIL—63; STOP AND BACK—87.

CHEVROLET

Model "Confederate", Series BA, (1932)



BATTERY

Delco-Remy, 13-H, 6 volts. Negative Terminal Grounded
 Starting Capacity—102 amps. for 20 minutes.
 Lighting Capacity—4.9 amps. for 20 hours.
 Box—Length, 9-23/32; width, 7-1/16; height, 8-31/32 inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 714-L

Connection to Engine—Bendix Drive.
 Running Free—65 amps. at 5 volts, 5000 R.P.M.
 Cranking Engine—165 to 175 amps. at 4.3 volts.
 Lock Torque—12 pound-feet, 475 amps., 3.63 volts.
 Brush Spring Tension—24 to 28 oz. on each.
 Starting Switch—Delco-Remy, 827411 (on starter).
 Armature—Delco-Remy, 818002.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 633-J

Breaker—Contact separation .018 to .022 inch.
 Contact Spring Tension—17 to 22 oz.

Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston coming up on compression stroke, flywheel mark (which is found 12 degrees before T.D.C.) opposite pointer, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 19. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston is .043 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (AC type G-12); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—31 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
700	Start	350	Start
1000	5	500	2½
1200	8	600	4
1600	15	800	7½
2000	21	1000	10½
2400	28	1200	14
2600 (Max.)	31	1300	15½

Ignition Coil—Delco-Remy, 528-B.

Ignition Switch—Delco-Remy "Electrolock" 427-H.

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 943-J. (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	16	1650	8.
5	850	7.1	18	1850 (Max.)	8.2
12	1250	7.8			

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 817221.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-H

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-H. (Not interchangeable with 1930 and 1931 switches.)

Location—Behind instrument board. Operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back.

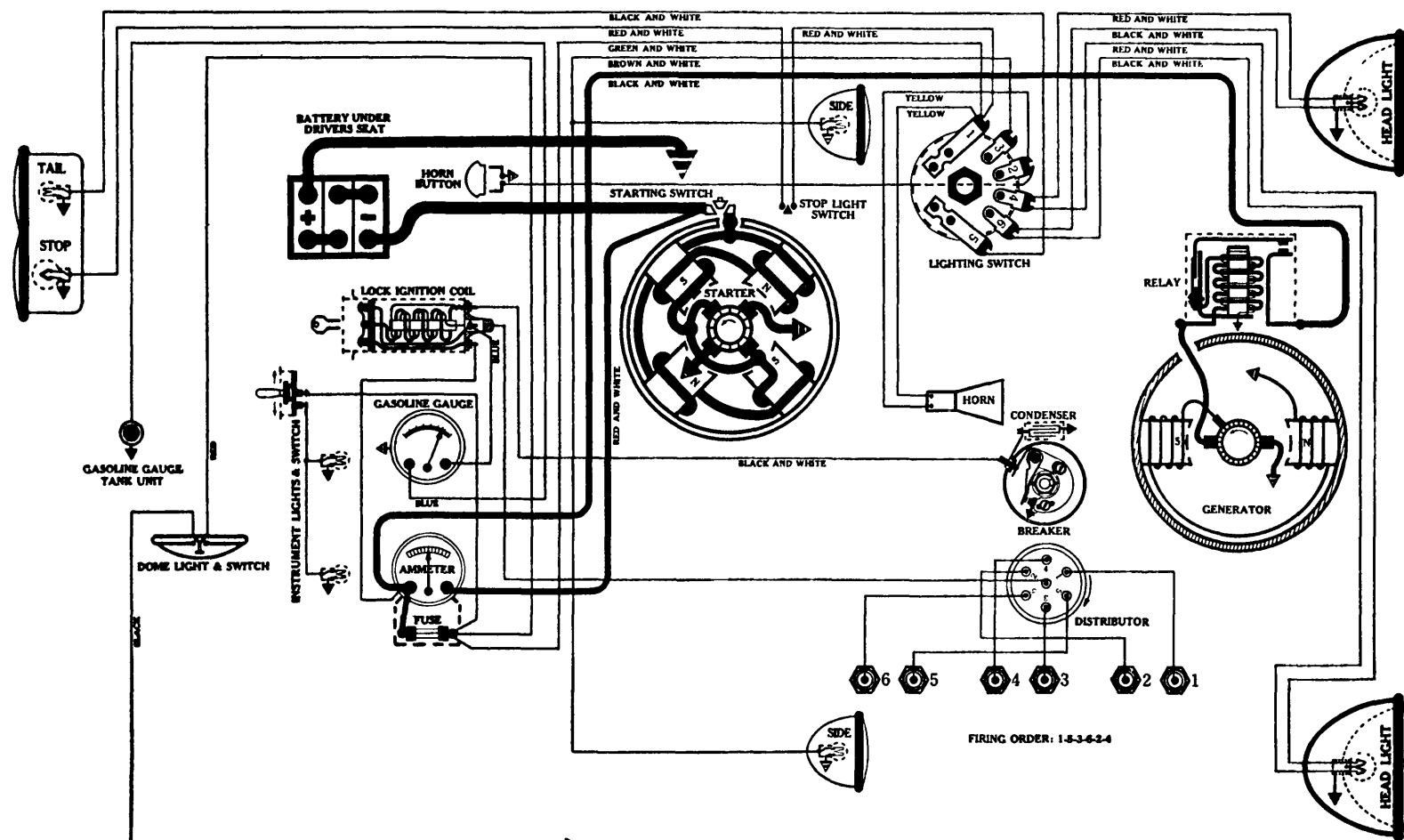
Foot Dimming Switch—Delco-Remy, 465-H.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; STOP—87; TAIL—63; INSTRUMENT—63; DOME—87.

CHRYSLER

"Flaring Power," Model CI, 6 cyl. (1932)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded

Starting Capacity—114 amps. for 20 minutes.

Lighting Capacity—5.7 amps. for 20 hours.

Box—Length, 10-5/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 725-Q

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—165 to 185 amps. at 4.2 volts.

Lock Torque—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 632-L

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Contact Spring Tension—17 to 21 oz.

Timing—Remove inspection cover plate located on left front side of flywheel housing, directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when mark on flywheel is opposite "IGN. 10" pointer on timing indicator plate. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .034 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Special Metric (AC type K-12); Gap .028 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—16 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1240	4	620	2
1700	8	850	4
2120	12	1060	6
2600 (Max.)	16	1300	8

Lock Ignition Coil—Delco-Remy, 534-Z.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 943-S (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	800	6.5	12	1250	7.5
4	900	6.8	16	1600	8.1
8	1050	7.1	17	2300 (Max.)	8.3

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 4½ volts.

Field Test—3½ to 4 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9271.

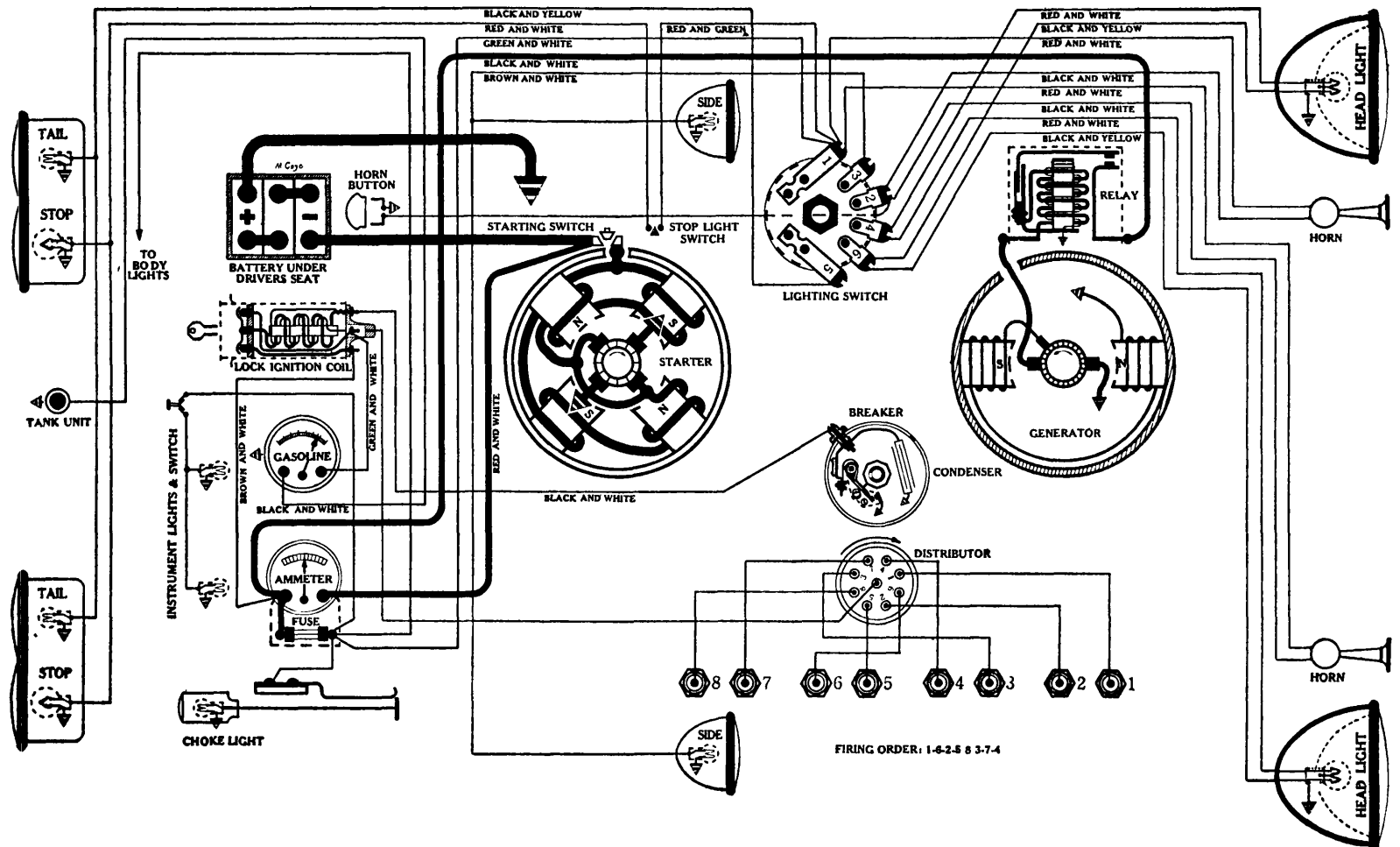
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20) mounted below ammeter, behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

CHRYSLER

"Floating Power", Model CP, Straight Eight, (1932)



BATTERY

Willard, WS-4-17, 6 volts. Positive Terminal Grounded

Starting Capacity—130 amps. for 20 minutes.

Lighting Capacity—6.6 amps. for 20 hours.

Box—Length, 11-11/16; width, 7-1/16; height, 8 3/4 inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 728-K

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on starter. This is a gear reduction job.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—150 to 160 amps. at 4.4 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 661-G

(Full Automatic Spark Advance)

IMPORTANT NOTE!—The 661 series of Delco-Remy Distributors, designed for 1932 use, employ an EIGHT POINT CAM which operates but a SINGLE BREAKER ASSEMBLY. These distributors do not require synchronizing.

Breaker—Contact separation .014 inch.

NOTE:—Due to the peculiar design of the ignition cam, to insure good high speed performance, the contact separation must be accurately adjusted to .014 inch and NO MORE.

Contact Spring Tension—24 to 26 oz.

Timing:—Remove inspection cover plate, located on left front side of flywheel housing, directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when mark on flywheel is opposite "IGN. 10°" pointer on timing indicator plate. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE:—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 29. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .034 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Special Metric (AC type K-12); Gap .028 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—12 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1460	4	730	2
1800	6	900	3
2100	8	1050	4
2800 (Max.)	12	1400	6

Lock Ignition Coil—Delco-Remy, 534-Z.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat", "Gauge", and "Timer". Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 943-S, (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	800	6.5	12	1250	7.5
4	900	6.8	16	1600	8.1
8	1050	7.1	17	2300 (Max.)	8.3

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 4 1/2 volts.

Field Test—3 1/2 to 4 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment:—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9271.

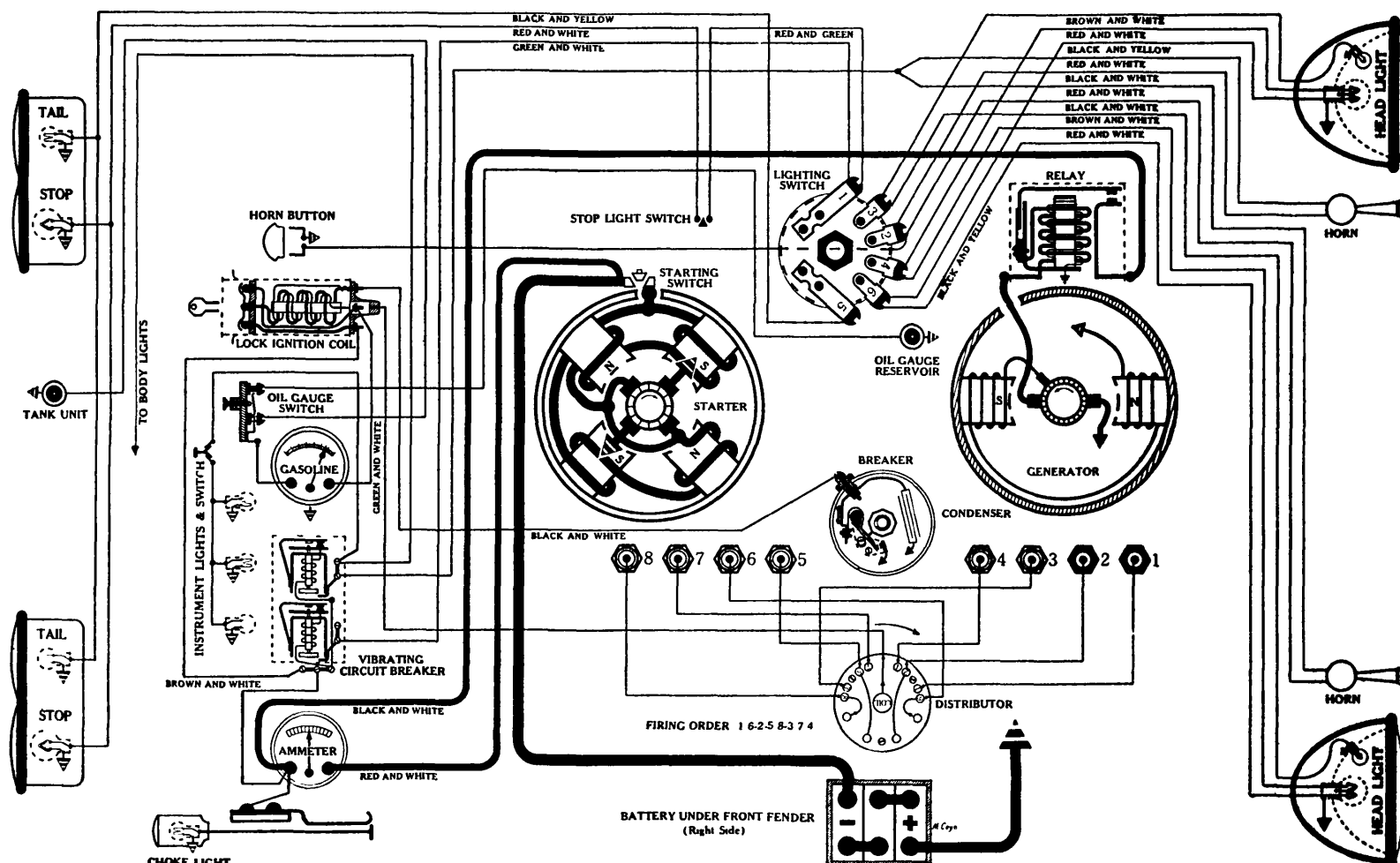
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20) mounted below ammeter, behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; CHOKE LIGHT—63; DOME—63; STOP—87; TAIL—63.

CHRYSLER

"Floating Power," Model CL, Imperial Custom Straight Eight (1932)



BATTERY

Willard, SJWR-6, 6 volts. Positive Terminal Grounded

Starting Capacity—166 amps. for 20 minutes.

Lighting Capacity—7.5 amps. for 20 hours.

Box—Length, 13; width, 7-1/16; height, 9 1/4 inches.

STARTER

Rotation, R. H., Com. End

Delco-Remy, 728-L

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on starter. This is a gear reduction job.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—150 to 160 amps. at 4 1/2 volts.

Lock Torque—28 pound-feet, 600 amps, at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 16210.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 661-F

(Full Automatic Spark Advance)

IMPORTANT NOTE!—The 661 series of Delco-Remy Distributors, designed for 1932 use, employ an EIGHT POINT CAM which operates but a SINGLE BREAKER ASSEMBLY. These distributors do not require synchronizing.

Breaker—Contact separation .014 inch.

NOTE—Due to the peculiar design of the ignition cam, to insure good high speed performance, the contact separation must be accurately adjusted to .014 inch and NO MORE.

Contact Spring Tension—24 to 26 oz.

Timing with MOTOR GAUGE—Remove 1/8 inch pipe plug in cylinder head above No. 8 piston, and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12. Slowly turn engine until No. 8 piston is coming up on exhaust stroke. Stop when .038 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Special Metric (AC type K-12); Gap .028 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—18 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1160	4	580	2
1540	8	770	4
1920	12	960	6
2300	16	1150	8
2500 (Max.)	18	1250	9

Lock Ignition Coil—Delco-Remy, 534-Z.

NOTE—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked 'Bat.', 'Gauge,' and 'Timer.' Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 957-G (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts
0	750	6.5
5	1000	7.2
11	1200	7.9
15	1400	8.
18	2000 (Max.)	8.2

Motoring Freely—4 to 5 amps. at 6 volts.

Max. Stall Current—19 to 20 amps. at 6 volts.

Field Test—3 to 3 1/2 amps. at 6 volts, across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1840941.

Third Brush Adjustment—Loosen cover band. See "Third Brush Adjustment" page, Sec. AA.

RELAY
Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9271.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breakers—Delco-Remy, 410-H. Start—25 to 30 amps. Operate—10 to 15 amps.

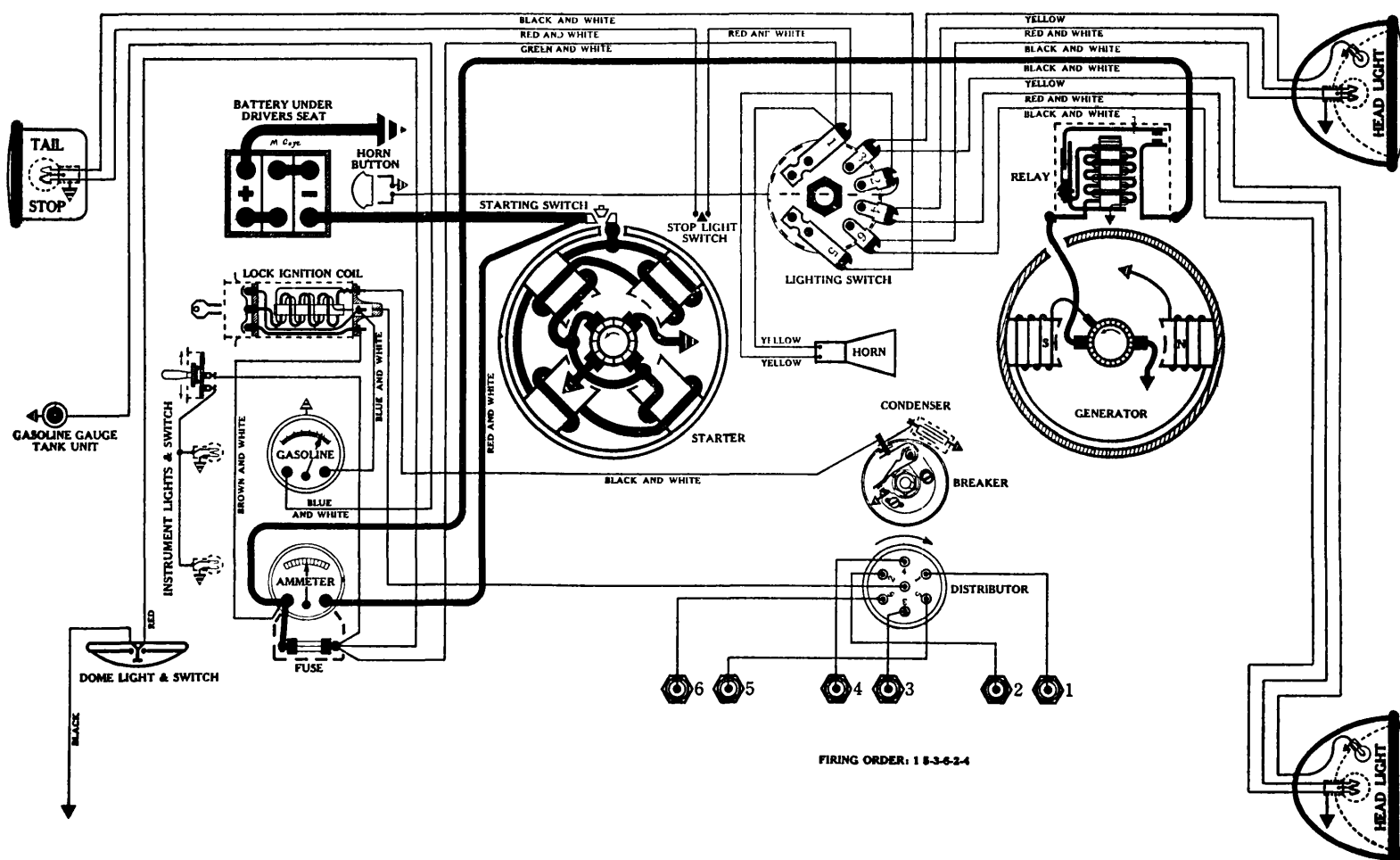
Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); AUX.

—63; INSTRUMENT—63; CHOKE LIGHT—63; DOME—63;

STOP—87; TAIL—63.

DE SOTO

"Floating Power", Model SC, 6 cyl., (1932)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—4.9 amps. for 20 hours.
Box—Length, 9-1/16; width, 7-1/16; height, 8 3/8 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 725-Q

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—165 to 185 amps. at 4 1/2 volts.
Lock Torque—15 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 820052.
Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 632-L

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch
Contact Spring Tension—17 to 21 oz.
Timing—Remove inspection cover plate located on left front side of flywheel housing, directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when mark on flywheel is opposite "IGN. 9°" pointer on timing indicator plate. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .026 inch beore T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—Special Metric (AC type K-12); Gap .028 inch.
Firing Order—1-5-3-6-2-4.
Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1240	4	620	2
1700	8	850	4
2120	12	1060	6
2600 (Max.)	16	1300	8

Lock Ignition Coil—Delco-Remy, 534-Z.

NOTE This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.", "Gauge", and "Timer". Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 943-S, (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	800	6.5	12	1250	7.5
4	900	6.8	16	1600	8.1
8	1050	7.1	17	2300 (Max.)	8.3

Motoring Freely—5 to 5 1/2 amps. at 6 volts.
Max. Stall Current—24 to 26 amps. at 4 1/2 volts.
Field Test—3 1/2 to 4 amps. at 6 volts across field coils in series.
Brush Spring Tension—24 to 28 oz. on each.
Armature—Delco-Remy, 1838448.
Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

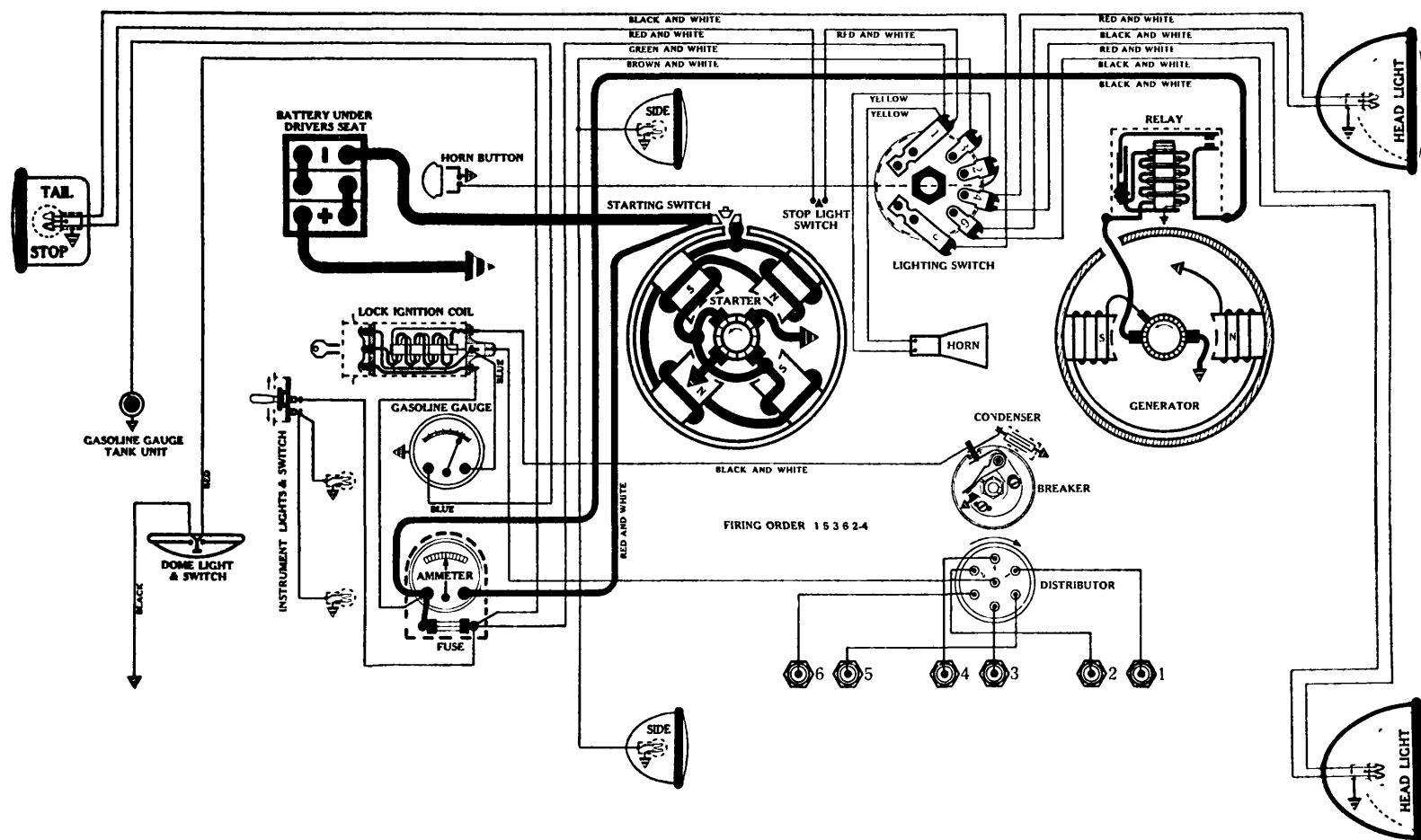
Closes—7 to 7 1/2 volts.
Opens—0 to 2 1/2 amps. discharge.
Contact Gap—.015 to .025 inch.
Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9271.
Location—Foot of steering column. Lights controlled by lever on steering wheel.
Fuses—Single 20 amp. fuse (type 3A-20) mounted below ammeter, behind instrument board.
Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

DODGE

"Floating Power," Model DL, 6 cyl. (1932)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded

Starting Capacity—114 amps. for 20 minutes.

Lighting Capacity—5.7 amps. for 20 hours.

Box—Length, 10-5/16; width, 7-1/16; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 725-Q

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—165 to 185 amps. at 4.2 volts.

Lock Torque—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 632-L

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Contact Spring Tension—17 to 21 oz.

Timing—Remove inspection cover plate located on left front side of flywheel housing, directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when mark on flywheel is opposite "IGN. 10°" pointer on timing indicator plate. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .032 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Special Metric (AC type K-12); Gap .028 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1240	4	620	2
1700	8	850	4
2120	12	1060	6
2600 (Max.)	16	1300	8

Lock Ignition Coil—Delco-Remy, 534-Z.

NOTE—This unit is a combined ignition switch and coil. Impossible to 'jump out' ignition switch with wire to run engine. Coil has three 'primary' terminals marked "Bat", "Gauge", and "Time". Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 943-S (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	800	6.5	12	1250	7.5
4	900	6.8	16	1600	8.1
8	1050	7.1	17	2300 (Max.)	8.3

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 4 1/2 volts.

Field Test—3 1/2 to 4 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9271.

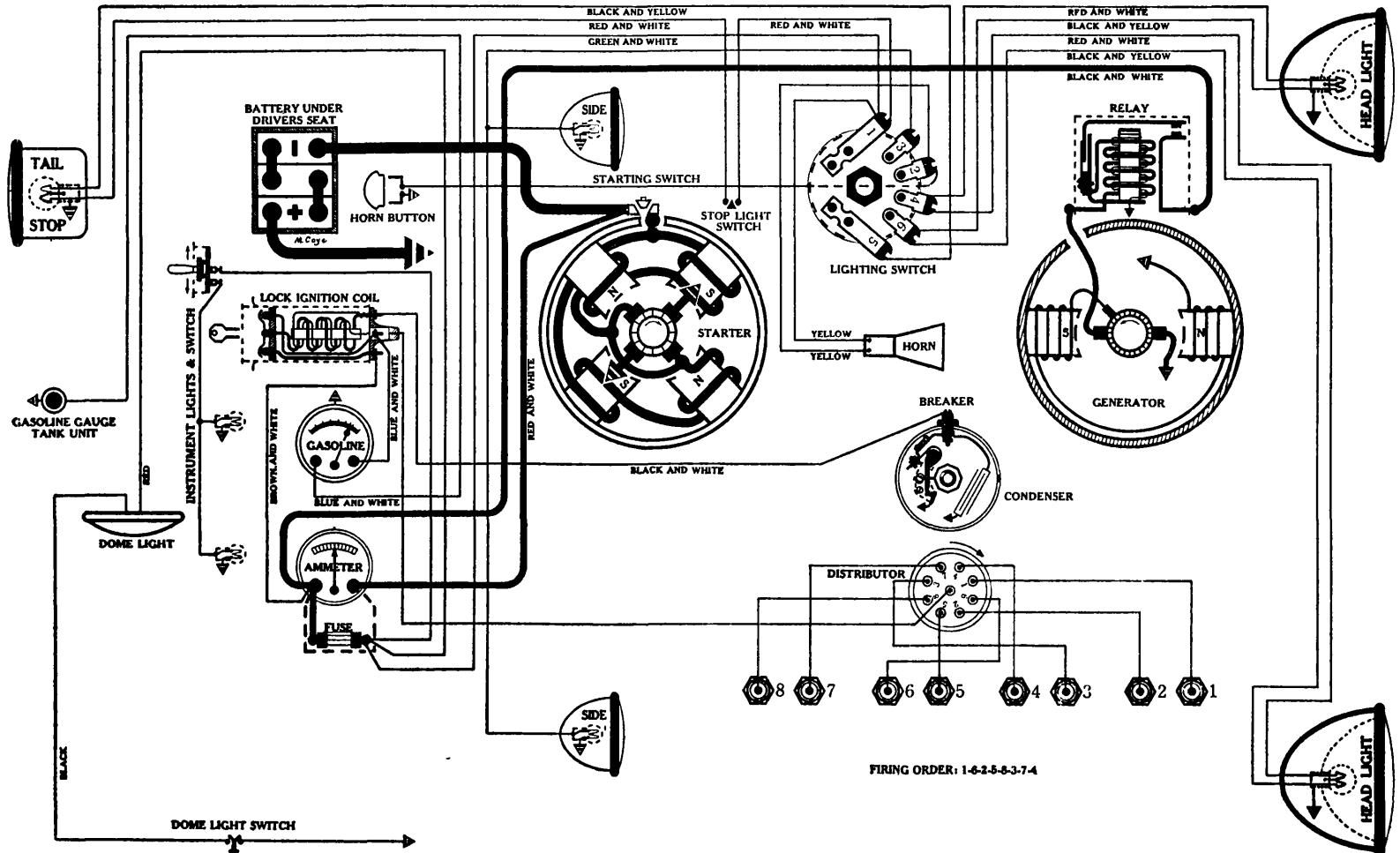
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20) mounted below ammeter, behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

DODGE

"Floating Power", Model DK, Straight Eight, (1932)



BATTERY

Willard, WS-4-17, 6 volts. Positive Terminal Grounded
 Starting Capacity—130 amps. for 20 minutes.
 Lighting Capacity—6.6 amps. for 20 hours.
 Box—Length, 11-11/16; width, 7-1/16; height, 8 3/4 inches.

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 728-K

Connection to Engine—Mechanical gear shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter. This is a gear reduction job.

Running Free—70 amps. at 5 volts, 2500 R.P.M.
 Cranking Engine—150 to 160 amps. at 4.4 volts.
 Lock Torque—28 pound-feet, 600 amps. at 3 volts.
 Brush Spring Tension—24 to 28 oz. on each.
 Starting Switch—Delco-Remy, 820052.
 Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 661-D

(Full Automatic Spark Advance)

IMPORTANT NOTE!—The 661 series of Delco-Remy Distributors, designed for 1932 use, employ an EIGHT POINT CAM which operates but a SINGLE BREAKER ASSEMBLY. These distributors do not require synchronizing.

Breaker—Contact separation .014 inch.

NOTE:—Due to the peculiar design of the ignition cam, to insure good high speed performance, the contact separation must be accurately adjusted to .014 inch and NO MORE.

Contact Spring Tension—24 to 26 oz.

Timing—Remove inspection cover plate, located on left front side of flywheel housing, directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when mark on flywheel is opposite "IGN. 10°" pointer on timing indicator plate. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 29. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .032 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Special Metric (AC type K-12); Gap .028 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—15 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1000	2	500	1
1200	4	600	2
1400	6	700	3
1700	8	850	4
1900	10	950	5
2000	12	1000	6
2200 (Max.)	15	1100	7 1/2

Lock Ignition Coil—Delco-Remy, 584-Z.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.", "Gauge", and "Timer". Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 943-S, (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	800	6.5	12	1250	7.5
4	900	6.8	16	1600	8.1
8	1050	7.1	17	2300 (Max.)	8.3

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 4 1/2 volts.

Field Test—3 1/2 to 4 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9271.

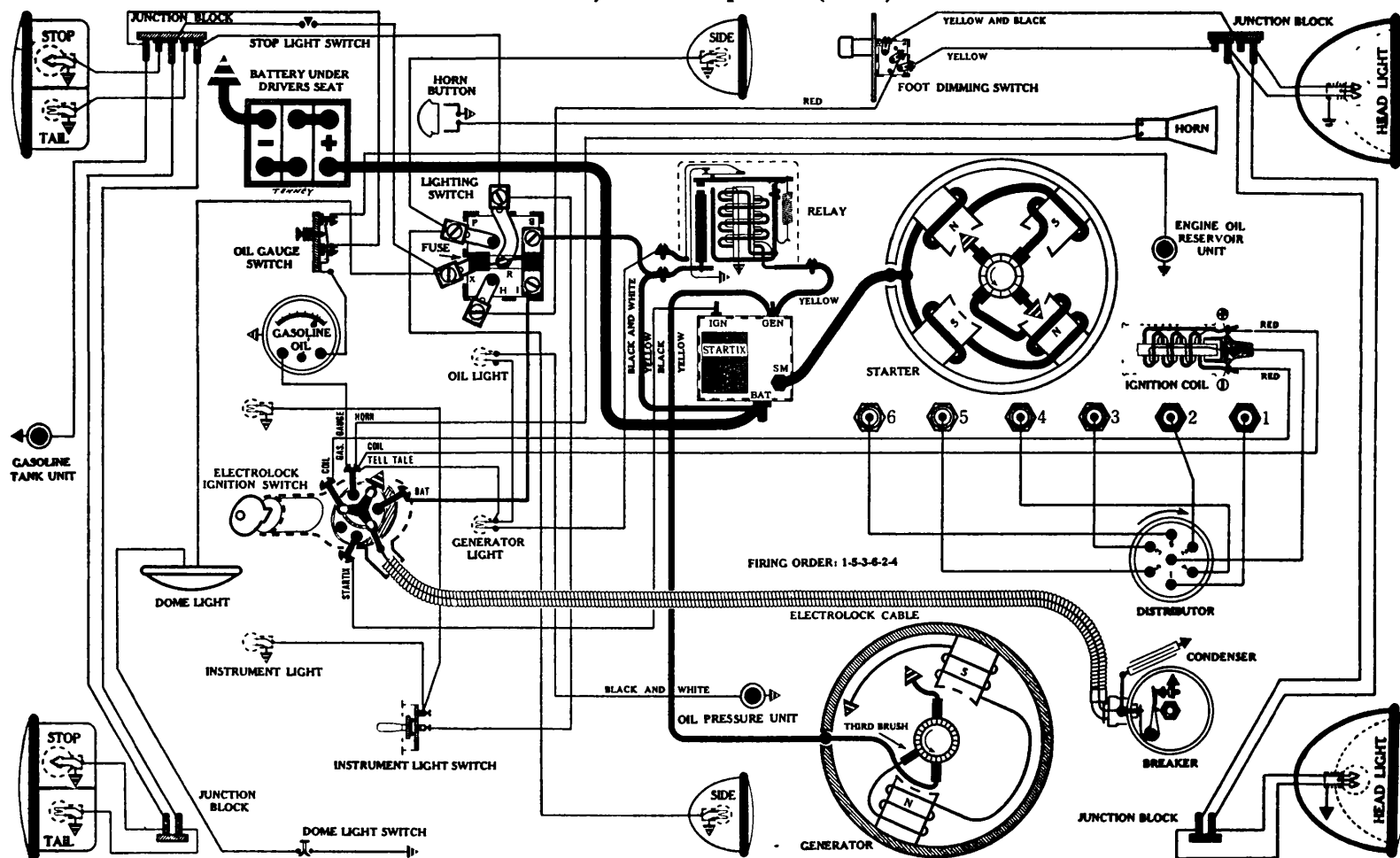
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20) mounted below ammeter, behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

ESSEX

Model, Great r Sup r Six (1932)



BATTERY

Exide, 3-VXA-15-1, 6 volts. Negative Terminal Grounded
Starting Capacity—122 amps. for 20 minutes.
Lighting Capacity—5.1 amps. for 20 hours
Box—Length, 10-9/32; width, 7; height, 9-5/32 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAJ-4025

Connection to Engine—Bendix Drive.

Running Free—67 amps. at 5.5 volts, 5000 R.P.M.

Cranking Engine—170 amps. at 5.1 volts, 225 R.P.M.

Lock Torque—12½ pound feet, 575 amps., 3 volts.

Brush Spring Tension—36 to 40 oz. on each.

Starting Switch—"Startix," type D, Automatic Starting Switch and Anti-Stall Device, manufactured by the Eclipse Machine Corp., Elmira, N. Y. For complete details of operation and instructions on servicing see Sec. AA.

Armature—Auto-Lite, MAJ-2049.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4344

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps	R.P.M.	Volts
0	600	6.2	11	1000	7.1
4	700	6.4	13	1200	7.5
7	800	6.7	13½	1400 (Max.)	7.5

Motoring Freely—4 to 4½ amps at 6 volts.

Max Stall Current—26 amps. at 5.7 volts.

Field Test—4 amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 20 oz. on main; 20 to 24 oz. on third.

Armature—Auto-Lite, GAL-2237.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGB-4052-A

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Contact Spring Tension—17 to 19 oz.

Timing—On engines using straight run gasoline; with No 1 piston on T.D.C., power stroke, flywheel mark "UDC 1-6" opposite pointer, rotor opposite No 1 Dist Cap Terminal, breaker points should just open. On engines using Ethyl gasoline, set breaker points to open when flywheel mark "UDC 1-6" is ¾ inch below pointer, as No. 1 piston is coming up on compression stroke.

Timing with MOTOR GAUGE—(NOTE: Use Motor Gauge in No. 2 cylinder)—Remove No. 2 spark plug, and attach MOTOR

GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 2 piston is coming up on compression stroke. On engines using straight run gasoline stop when piston reaches exact T.D.C., as indicated on Gauge. On engines using Ethyl gasoline stop when .018 inch before T.D.C.; with rotor opposite No. 2 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (AC type G-8); Gap .022 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—30 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1900	10	950	5
2700	18	1350	9
4000 (Max)	30	2000	16

Ignition Coil—Auto-Lite, IG-4088.

Ignition Switch—"Electrolock," type 15-S. NOTE: This is a new type, three position ignition switch, designed especially for use on "Startix" equipped cars. When key is turned to left (emergency position) the ignition circuit is completed but the automatic starting device is inactive.

RELAY

Auto-Lite, CBA-4001

NOTE—This is a new type cut-out, designed for use on cars with a generator charging "tell-tale" light instead of the conventional ammeter. This unit has a third terminal stamped "T," which is grounded thru an extra set of points, when the regular cut-out points are open.

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. B-5670-A.

Location—Behind instrument board, operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on lighting switch.

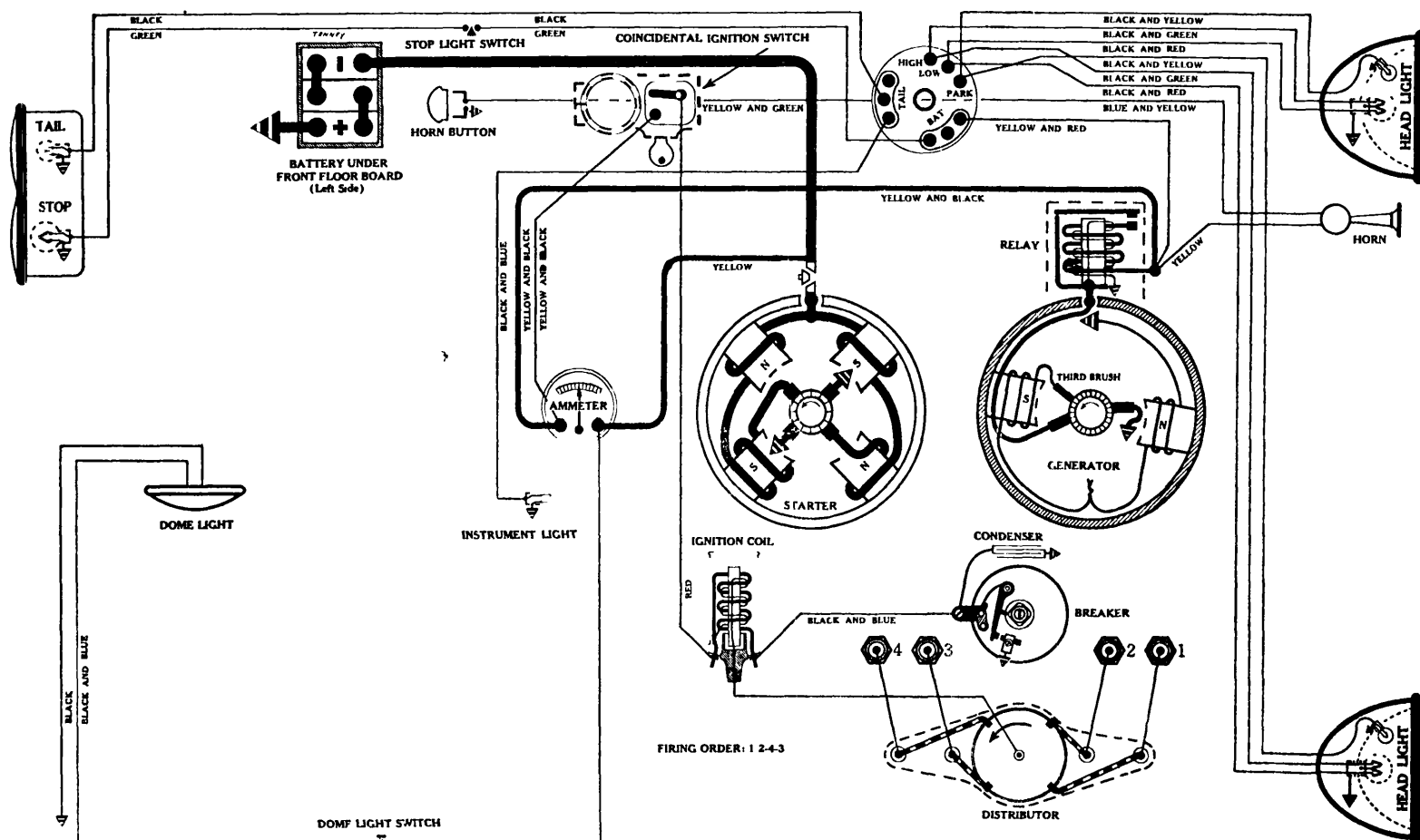
Foot Dimming Switch—Soreng-Manegold, A-2100-A.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; TAIL—63; INSTRUMENT—63; DOME—63; STOP—87. IMPORTANT! GENERATOR "Tell-tale" and OIL PRESSURE "Tell-tale" LIGHTS—64 (3 c.p. double contact). WARNING! under no circumstances should a single contact bulb be placed in these sockets, as it will result in a burned cut-out if placed in the generator side, and burned ignition switch and wires if placed in the oil side.

FORD

Model B, 4 cyl., (1932)



BATTERY

Ford, 6 volts. Positive Terminal Grounded
Starting Capacity—98 amps. for 20 minutes.
Lighting Capacity—4.8 amps. for 20 hours.
Box—Length, 9½; width, 7½; height, 9½ inches.

STARTER

Rotation, L. H., Com. End
Ford

Connection to Engine—Bendix Drive.
Running Free—60 amps. at 6 volts, 4150 R.P.M.
Cranking Engine—160 to 170 amps. at 4.2 volts.
Lock Torque—17 pound-feet, 520 amps. at 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Mounted on starting motor. Operated by pull cable.

IGNITION

Rotation, L. H., Top View
Ford

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz.
Timing—1. Check contact separation.
2. Loosen lock screw holding distributor arm, and adjust arm exactly central with center mark on distributor body.
3. Retighten screw, thus holding arm in this position.
4. Screw out TIMING PIN found in timing case cover, and insert rounded end in same hole.
5. Slowly turn engine until pin is felt to drop into recess in cam shaft gear.
6. Remove distributor cap and rotor.
7. Loosen cam locking screw.
8. Temporarily replace rotor and turn until metal strip is opposite No. 1 distributor outlet.
9. Remove rotor and set cam in a position which just causes breaker points to open at extreme end of back lash.
10. Lock cam; assemble distributor; replace timing pin.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 102 and rod No. 7. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C., as indicated on Gauge. With rotor opposite No. 1 distributor outlet, breaker points should just open.

Spark Plugs—¾ inch (Champion, type C-4-X); Gap .035 inch.
Firing Order—1-2-4-3.

Automatic Advance—14 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
700	Start	350	Start
1200	4	600	2
1700	8	850	4
2000	10	1000	5
2200	12	1100	6
2500 (Max.)	14	1250	7

Ignition Switch—Ford Coincidental (Combination Ignition Switch and Steering Post Lock).

GENERATOR

Rotation, L. H., Com. End
Ford, Two Pole (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	625	6.5	10	1220	7.8
2	680	6.6	11	1500 (Max.)	7.9
5	815	7.1			

Motoring Freely—5 amps. at 6 volts.
Maximum Stall Current—18 to 22 amps. at 6 volts.

Field Test—5.2 amps. at 6 volts.

Brush Spring Tension—35 to 40 oz. on each.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Ford

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .020 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Ford.

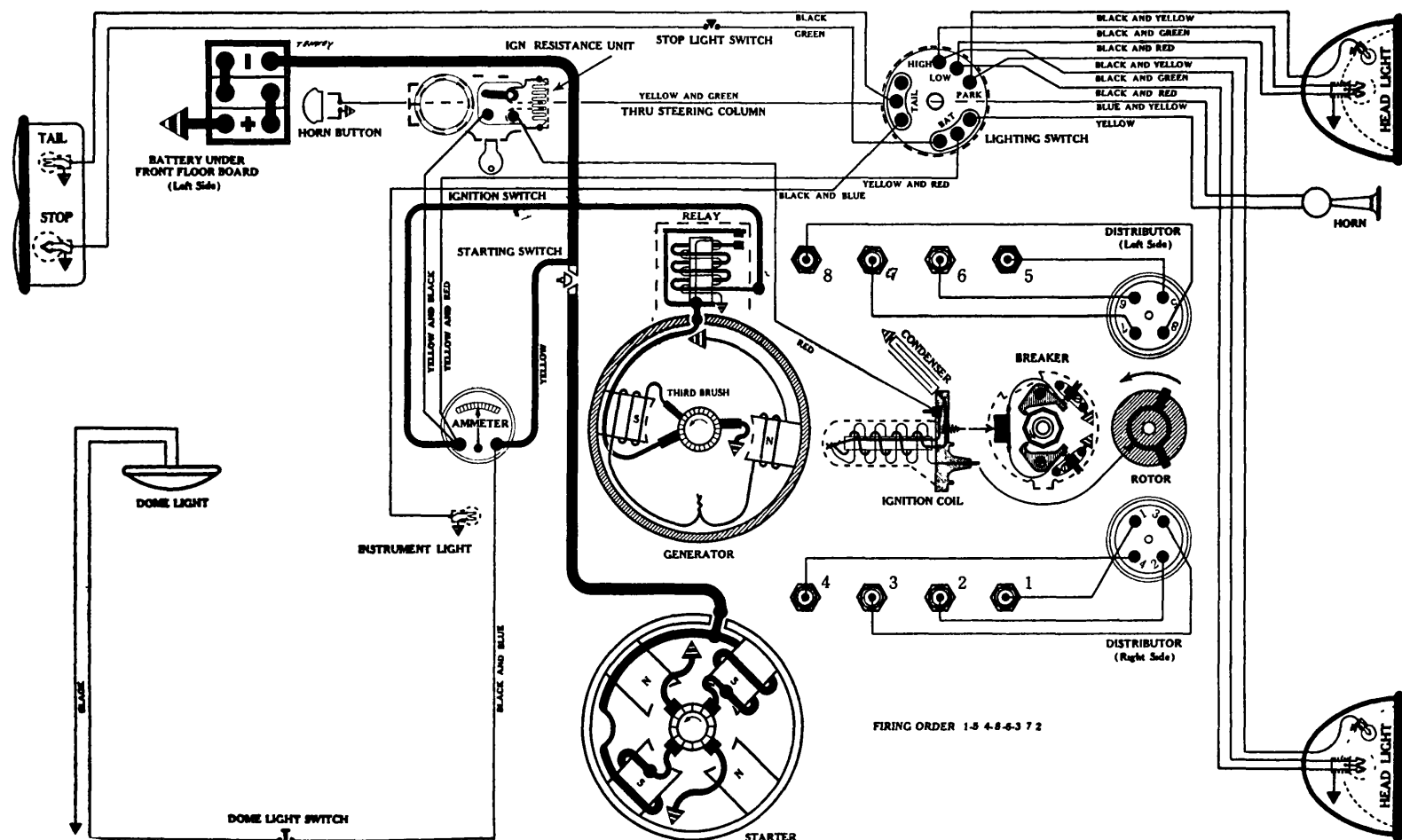
Location—Foot of steering column. Lights controlled by lever on steering wheel. Wires soldered to terminals.

Fuses—None.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); INSTRUMENT—63; AUX.—63; STOP—1129; TAIL—63.

FORD

Model 18, 90 degree "Vee" 8 (1932)



BATTERY

Ford, 6 volts. Positive Terminal Grounded

Starting Capacity—98 amps. for 20 minutes.

Lighting Capacity—4.8 amps. for 20 hours.

Box—Length, 9½; width, 7½; height, 9½ inches.

STARTER

Rotation, L. H., Com. End

Ford, Type 18-11002

Connection to Engin —Bendix Drive.

Running Free—35 to 40 amps. at 6 volts, 3960 R.P.M.

Cranking Engine—210 to 225 amps. at 4.5 volts

Lock Torque—12 pound-feet, 500 amps. at 3 volts.

Brush Spring Tension—32 to 36 oz. on each.

Armature—Ford, 18-11005.

IGNITION

Rotation, L. H., Viewed from Front

Special Ford, employing Mallory Breaker Principle

Full automatic spark advance in conjunction with Vacuum Governor Brake

Breakers—Contact separation .012 inch.

IMPORTANT NOTE—The unique Mallory breaker point design and construction makes it possible to use the very close contact separation of but .012 inch. To insure satisfactory high speed performance this contact separation must be maintained. For complete details on Mallory distributor design and the theory of their operation, see Sec. AA

Contact Spring Tension—10 to 12 oz. on each.

Timing—Construction of ignition drive assembly makes it impossible to attach unit to engine other than in correct position. Provision is made for a slight variation in spark timing by moving small 3/16 inch slotted cap screw (found on right side of ignition housing between mounting flange and right distributor cap) up, to increase spark advance, and down to retard. With screw in center of slot engine will have a spark advance of between 4 and 5 flywheel degrees which, theoretically, is the correct timing position.

Spark Plugs—¾ inch (Champion, type C-4-X); Gap .025 inch.

Firing Order—1-5-4-8-6-3-7-2.

Automatic Advance—18 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
500	Start	250	Start
840	4	420	2
1200	8	600	4
1500	12	750	6
1840	16	920	8
2000 (Max.)	18	1000	9

Ignition Switch—Ford Coincidental (Combination Ignition Switch and Steering Post Lock).

GENERATOR

Rotation, L. H., Com. End

Ford, Type 18-10000

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.7	10½	1300	7.7
3	800	6.9	10¾	1400	7.8
5	900	7.3	11	1500 (Max.)	7.9
7	1000	7.4	11	1600	7.9
9	1100	7.5	10½	1700	7.9
10	1200	7.6			

Motoring Freely—6 amps. at 6 volts.

Max. Stall Current—25 amps. at 5 volts.

Field Test—5½ amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on main; 20 to 24 oz. on third.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Ford

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .020 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Ford

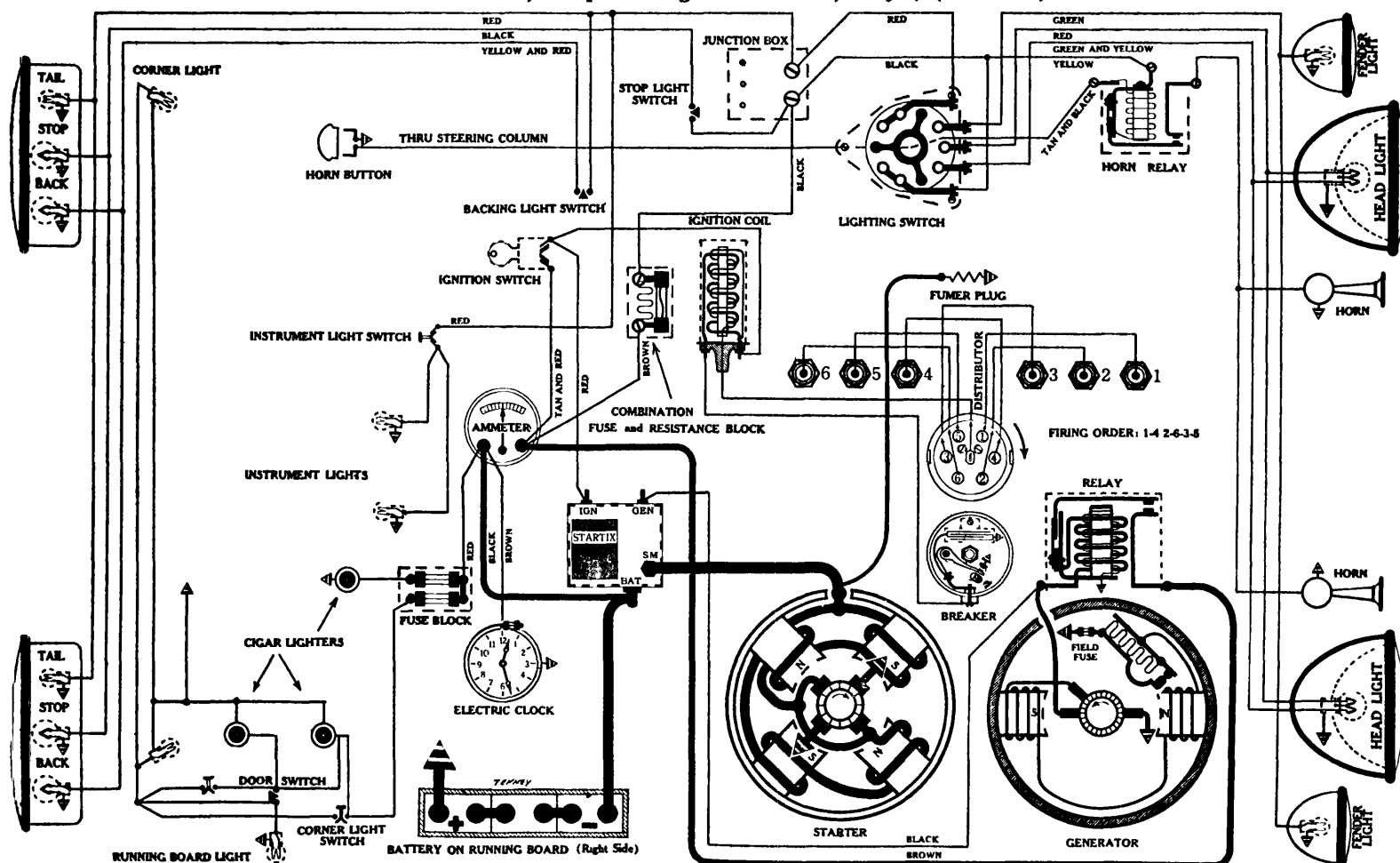
Location—Foot of steering column. Lights controlled by lever on steering wheel. Wires soldered to terminals.

Fuses—None.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); INSTRUMENT—63; AUX.—63; STOP—1129; TAIL—63.

FRANKLIN

Series Sixteen, "Supercharged Airman", 6 cyl., (1932-33)



BATTERY

Willard, WSB-21, 6 volts. Positive Terminal Grounded

Starting Capacity—175 amps. for 20 minutes.

Lighting Capacity—7.1 amps. for 20 hours.

Box—Length, 20-5/16; width, 5-7/16; height, 8 3/8 inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 723-C

Connection to Engine—Bendix Drive.

NOTE—Gear reduction job Pinion cut on armature shaft drives pinion on Bendix shaft

Running Free—70 amps. at 5 volts, 3500 R.P.M.

Cranking Engine—160 to 170 amps. at 4.6 volts.

Lock Torque—22 pound-feet, 600 amps., 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 408-A.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 643-N

Breaker—Contact separation .022 inch.

Contact Spring Tension—18 to 20 oz.

Timing—IMPORTANT! Time ignition in full advance position. Remove engine air housing over fan, that position of flywheel marks may be observed. No. 1 piston is in firing position when "O" mark on fan wheel is 1 inch to the right (generator side) of the mark found inside of fan housing, if piston is on compression stroke. When fan is in this position breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 4. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .027 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (Champion, Type C-7; Gap .025 inch.

Firing Order—1-4-2-6-3-5.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—31 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	0	200	0
800	6	400	3
1200	12	600	6
1700	20	850	10
2200	28	1100	14
2400 (Max.)	31	1200	15 1/2

Ignition Coil—Delco-Remy, 532-C.

Ignition Switch—Clum No. 9193 (Key Nos. H. F. 751 to H. F. 950 incl.)

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 957-E

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	14	1400	7.9
5	800	7.1	16	1600 (Max.)	8.
9	1000	7.5	15	1800	8.
12	1200	7.8			

NOTE Thermostat opens about 165° F., reducing charging rate approx 30-40%

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—15 to 17 amps. at 6 volts.

Field Test—3 amps. at 6 volts across field coils in series.

Field Fuse—6 amps. (type 7A-6).

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 828292.

Third Brush Adjustment—Loosen cover band. See Figure 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-V.

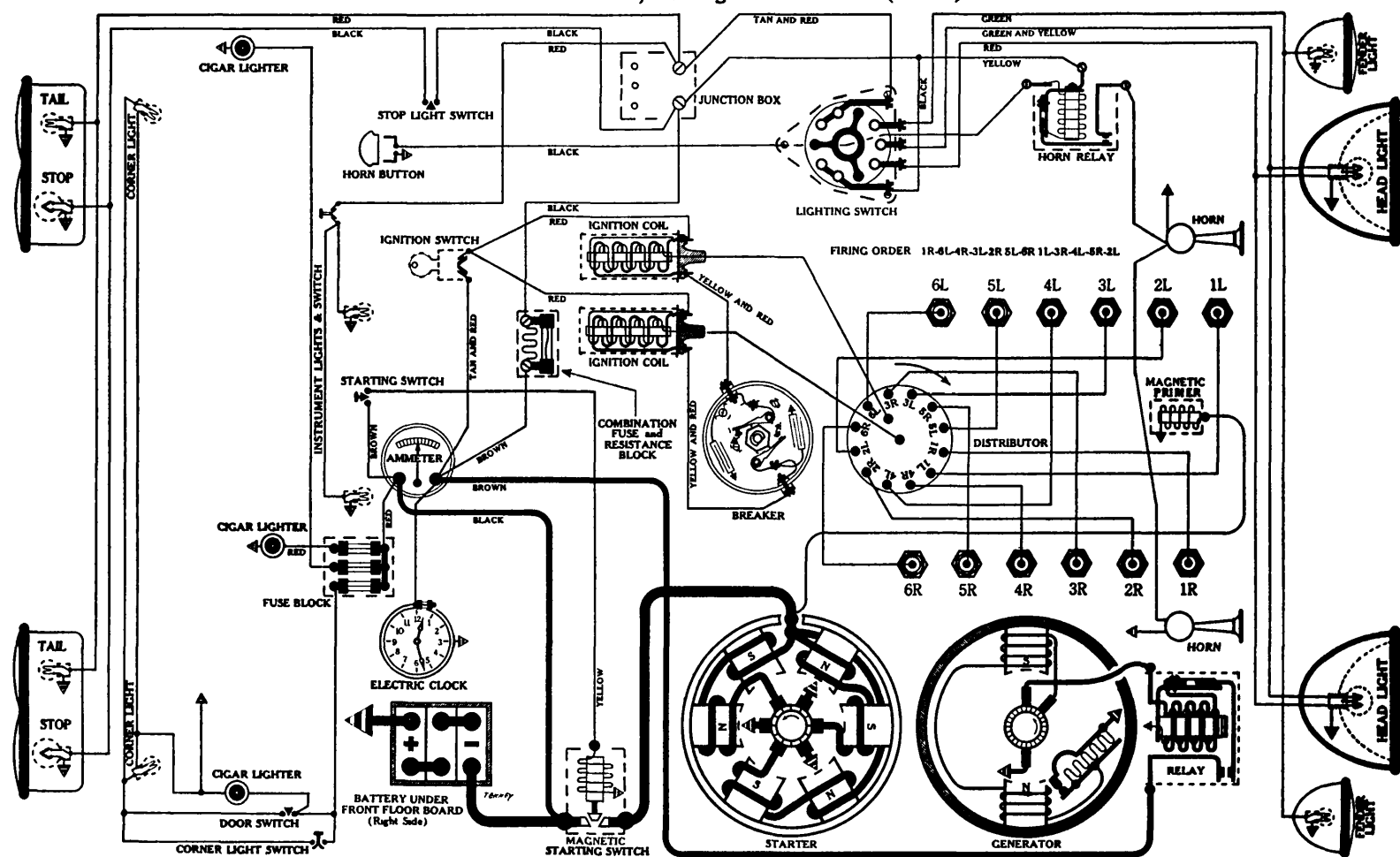
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—20 amp fuse (type 5A-20), mounted on combination fuse block and resistance assembly. Two 20 amp. fuses (type 3A-20) on fuse block for cigar lighters and body lights.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; CORNER—63; RUNNING BOARD—63; STOP—87; BACKING—87; TAIL—63.

FRANKLIN

Series Seventeen, 60 degree "Vee" 12 (1932)



BATTERY

Willard, RH-5-19, 6 volts. Positive Terminal Grounded
Starting Capacity—180 amps. for 20 minutes.
Lighting Capacity—7.6 amps. for 20 hours.
Box—Length, 13; width, 7-1/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 545

Connection to Engine—Bendix Drive
Running Free—70 amps. at 5 volts, 3000 R.P.M.
Cranking Engine—255 to 270 amps. at 4 1/2 volts.
Lock Torque—19 pound-feet, 500 amps. at 3 volts
Brush Spring Tension—36 to 40 oz. on each.
Starting Switch—Mounted beside starter. Magnetic type switch controlled by press button on instrument board.
Armature—Delco-Remy, 37895.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 667-A

Breakers—Contact separation .018 inch.

NOTE—Due to the peculiar design of the ignition cam, to insure good high speed performance the contact separation must be accurately adjusted to .018 inch and no more.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 30 degrees after stationary. Equal intervals of 30 degrees between interruptions.

Timing—IMPORTANT! Time ignition in full advance position. Remove engine an housing over fan, that position of flywheel marks may be observed. No. 6L piston is in firing position when "O" mark on fan wheel is 3/4 inch to the right (generator side) of the mark found inside of fan housing, if piston is on compression stroke. When fan is in this position the stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 6L spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 6, in conjunction with plate No. 120. (Place plate on top of No. 113 adapter to prevent rod from sliding thru). Slowly turn engine until No. 6L piston is coming up on compression stroke. Stop when .017 inch before T.D.C., as indicated on Gauge. With rotor under No. 6L Dist Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (Champion, type C-7); Gap .025 inch

Firing Order—1R-6L-4R-3L-2R-5L-6R-1L-3R-4L-5R-2L.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—12 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	Start	200	Start
800	2	400	1
1200	4	600	2
2000	8	1000	4
2400	10	1200	5
2800 (Max.)	12	1400	6

Ignition Coils—Delco-Remy, 528-C.

Ignition Switch—Clum, No. 9193.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 931-G

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	400	6.4	16	720	7.8
4	460	6.7	20	840	8.
8	520	7.	24	1400 (Max.)	8.4
12	600	7.4			

NOTE—Thermostat opens about 165° F., reducing charging rate approx 30 to 40%.

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5 1/2 volts.

Field Test—3 1/2 amps at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1844671.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-V.

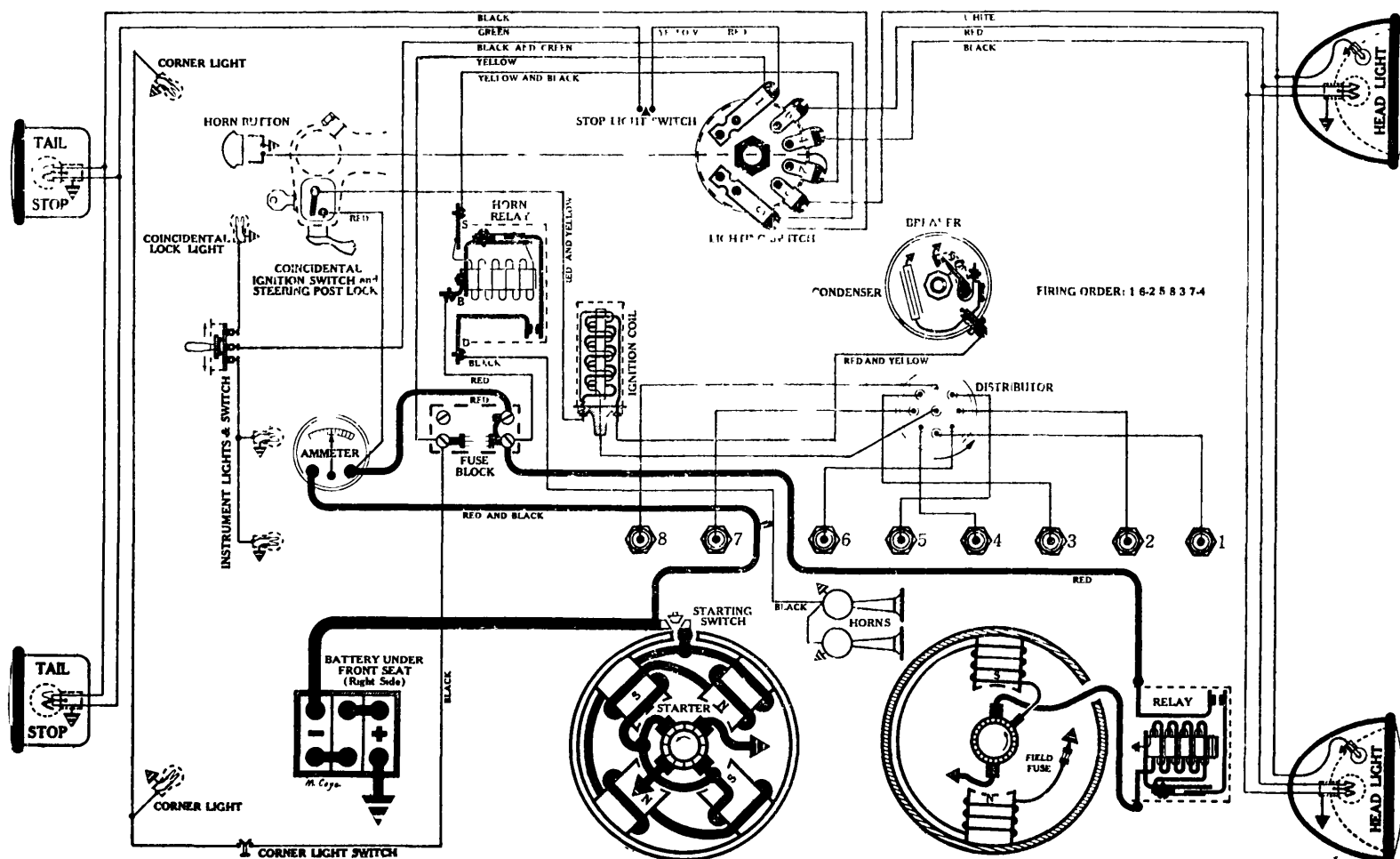
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—20 amp. fuse (type 5A-20), mounted on combination fuse block and resistance assembly. Three 20 amp. fuses (type 3A-20) on fuse block for cigar lighters and body lights.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; CORNER—63; STOP—87; TAIL—63.

GRAHAM

"Blue Streak Sixes", Model 57, Standard and DeLuxe Straight Eights, (1932)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—5.7 amps. for 20 hours.
Box—Length, 10-5/16; width, 7-1/16; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 725-K

Connection to Engine—Mechanical gear shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—165 to 185 amps. at 4.2 volts.
Lock Torque—16 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 820052.
Armature—Delco-Remy, 822187.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 661-J

(Full Automatic Spark Advance)

IMPORTANT NOTE! The 661 series of Delco-Remy Distributors, designed for 1932 use, employ an EIGHT POINT CAM which operates but a SINGLE BREAKER ASSEMBLY. These distributors do not require synchronizing.

Breaker—Contact separation .014 inch.

NOTE: Due to the peculiar design of the ignition cam, to insure good high speed performance, the contact separation must be accurately adjusted to .014 inch and NO MORE.

Contact Spring Tension—24 to 26 oz.

Timing—With No. 1 piston on compression stroke, bring flywheel mark "SA-1" opposite pointer on flywheel housing. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .011 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—3/8 inch (Champion type C-5); Gap .024 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—15 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
1000	Start	500	Start
1800	4	900	2
2600	8	1300	4
3400	10	1700	5
4100 (Max.)	15	2050	7 1/2

Ignition Coil—Delco-Remy, 528-C.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 965-V

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	15	1400	8.
5	1000	7.2	18	2000 (Max.)	8.2
11	1200	7.9			

Motoring Freely—3 to 3 1/2 amps. at 6 volts.

Max. Stall Current—19 to 20 amps. at 6 volts.

Field Test—2 amps. at 6 volts across field coils in series.

Field Fuse—6 amps. (type 7A-6).

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1844827.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Ser. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9318.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

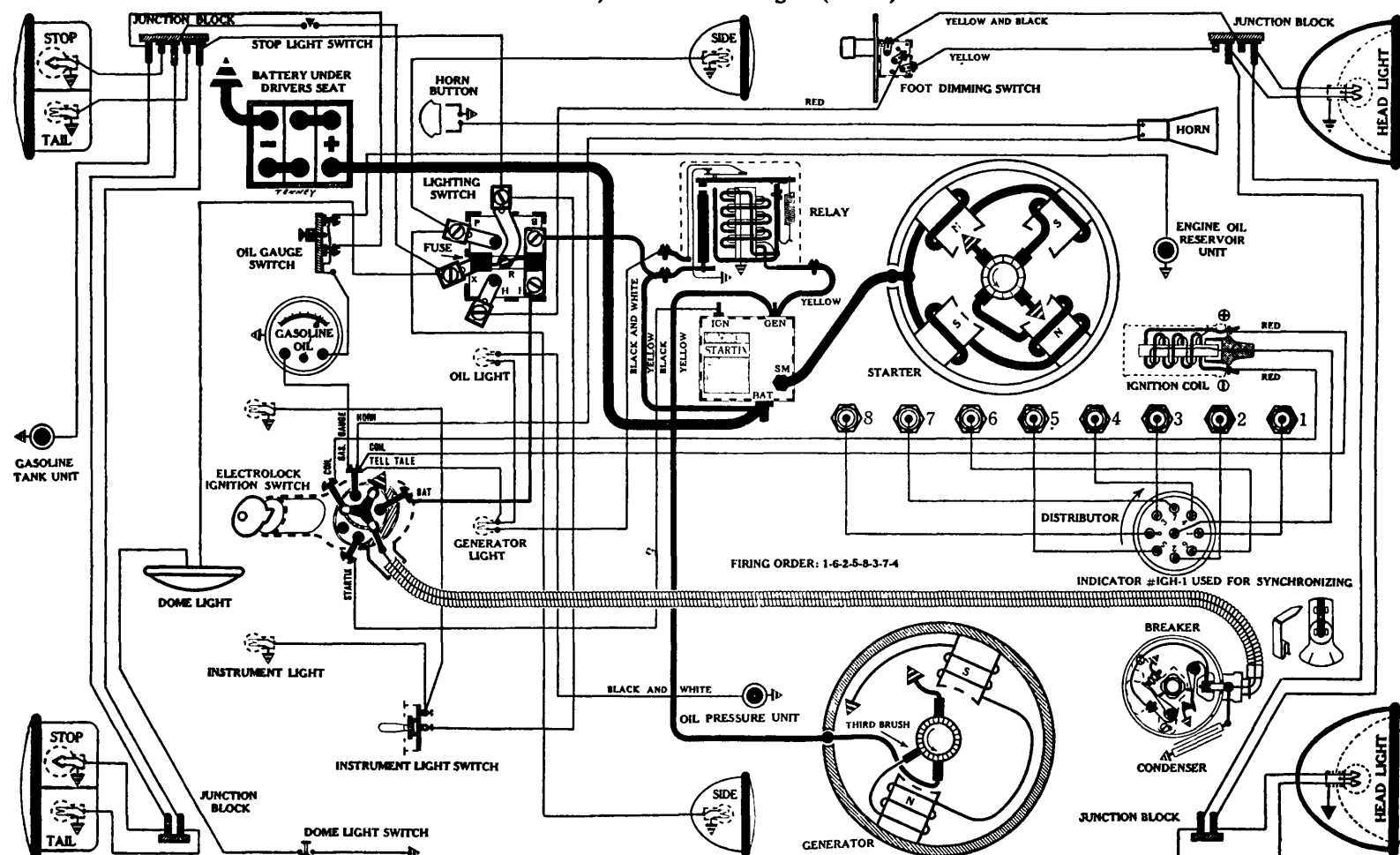
Fuse—Single 20 amp. fuse (type 3A-20) mounted on dash (driver's side).

Horn Relay—Klaxon, 266-T. (Used on early 1932 cars only).

Lamps—See Lamp Table, Sec. AA. HEAD—1116 (Bifocal); AUX.—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

HUDSON

Model, The Greater Eight (1932)



BATTERY

Exide, 3-VXA-15-1, 6 volts. Negative Terminal Grounded
 Starting Capacity—122 amps. for 20 minutes.
 Lighting Capacity—5.1 amps. for 20 hours.
 Box—Length, 10-9/32; width, 7; height, 9-5/32 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAB-4041

Connection to Engine—Bendix Drive.
 Running Free—46 amps. at 5.5 volts, 4020 R.P.M.
 Cranking Engine—170 to 185 amps. at 5 volts.
 Lock Torque—17 pound feet, 520 amps. at 3 volts.
 Brush Spring Tension—44 to 56 oz. on each (with new brushes).
 Starting Switch—"Startix," type D, Automatic Starting Switch and Anti-Stall Device, manufactured by the Eclipse Machine Corp., Elmira, N. Y. For complete details of operation and instructions on servicing see Sec. AA.

Armature—Auto-Lite, MAB-2094.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAL-4344

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.2	11	1000	7.1
4	700	6.4	13	1200	7.5
7	800	6.7	13½	1400 (Max.)	7.5

Motoring Freely—4 to 4½ amps. at 6 volts.
 Max. Stall Current—26 amps. at 5.7 volts.
 Field Test—4 amps. at 6 volts across field coils in series.
 Brush Spring Tension—16 to 20 oz. on main; 20 to 24 oz. on third.
 Armature—Auto-Lite, GAL-2237.
 Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

IGNITION

Rotation, R. H., Top View
 Auto-Lite, IGH-4009-B

(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch.
 Contact Spring Tension—17 to 19 oz. on each.
 Synchronizing—Movable points open 45 degrees after stationary.
 Timing—On engines using straight run gasoline; with No. 1 piston on T.D.C., power stroke, flywheel mark "UDC 1-8" opposite pointer, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open. On engines using Ethyl gasoline, set stationary breaker points to open when flywheel mark "UDC 1-8" is 1¼ inches below pointer, as No. 1 piston is coming up on compression stroke.
 Timing with MOTOR GAUGE—Remove No. 1 spark plug and

attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. On engines using straight run gasoline stop when piston reaches exact T.D.C., as indicated on Gauge. On engines using Ethyl gasoline stop when .021 inch before T.D.C. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (AC type G-8); Gap .022 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Spark Advance—35 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800.....	Start	400.....	Start
2400.....	18	1200.....	9
3600.....	30	1800.....	15
4000 (Max.).....	35	2000.....	17½

Ignition Coil—Auto-Lite, CE-4017.

Ignition Switch—"Electrolock," type 15-S. NOTE: This is a new type, three position ignition switch, designed especially for use on "Startix" equipped cars. When key is turned to left (emergency position) the ignition circuit is completed, but the automatic starting device is inactive.

RELAY

Auto-Lite, CBA-4001

NOTE:—This is a new type cut-out, designed for use on cars with a generator charging "tell-tale" light instead of the conventional ammeter. This unit has a third terminal stamped "T," which is grounded thru an extra set of points, when the regular cut-out points are open.

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. B-5670-A.

Location—Behind instrument board, operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on lighting switch.

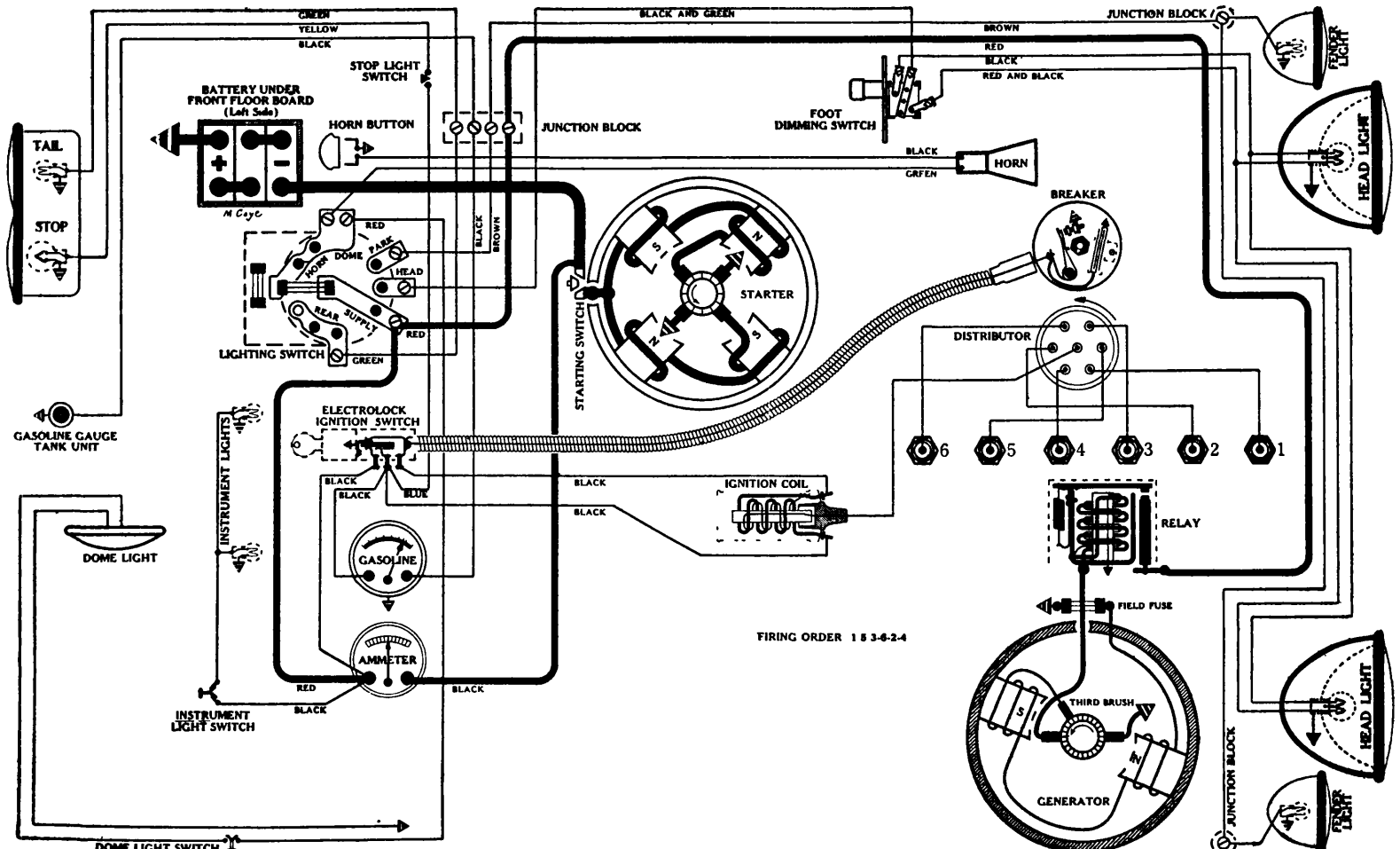
Foot Dimming Switch—Soreng-Manegold, A-2100-A.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); SIDE—63; TAIL—63; INSTRUMENT—63; DOME—63; STOP—87. IMPORTANT! GENERATOR "Tell-tale" and OIL PRESSURE "Tell-tale" LIGHTS—64 (3 c.p. double contact). WARNING! Under no circumstances should a single contact bulb be placed in these sockets, as it will result in a burned cut-out if placed in the generator side, and burned ignition switch and wires if placed in the oil side.

HUPMOBILE

Model B, Series 216, 6 cyl., (1932)



BATTERY

Willard, WH-2-15, 6 volts. Positive Terminal Grounded

Starting Capacity—140 amps. for 20 minutes.

Lighting Capacity—5.7 amps. for 20 hours

Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAJ-4003

Connection to Engine—Bendix Drive.

Running Free—50 amps. at 5.5 volts.

Cranking Engine—160 amps. at 4.2 volts, 228 R.P.M.

Lock Torque—12½ pound-feet, 575 amps., 3 volts.

Brush Spring Tension—44 to 48 oz. on each.

Starting Switch—Auto-Lite, MU-2208-S, mounted on starter. Operated by pull cable from instrument board. Tension on switch should not close with less than 7½ lbs. pull applied at right angles to hole in extreme end of lever.

Armature—Auto-Lite, MAJ-2048.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGC-4053

Breaker—Contact separation .018 inch.

Contact Spring Tension—17 to 19 oz.

Timing—With No. 1 piston on T.D.C., power stroke, flywheel mark "DC-1-6" in line with finished bosses on front face of clutch housing, spark fully retarded, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston is .032 inch before T.D.C., as indicated on Gauge. With spark in full advanced position, breaker points should just open.

Spark Plugs—Metric (Champion type C-7); Gap .028 to .030 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—24 degrees (on Flywheel).

Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1200	2	600	1
1800	8	900	4
2400	12	1200	6
2800	16	1400	8

Ignition Coil—Auto-Lite, IG-4080.

Ignition Switch—"Electrolock", type 5-B. For details of operation and instructions on servicing, see "1928 Thief-Proof Lock Ignition Switch" page, Section AA.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4324 (Driven by Timing Chain)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	650	6.5	10	1075	7.3
2	720	6.6	14	1340	7.7
5	850	7.	16	1800 (Max.)	8.

Motoring Freely—4½ to 5 amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Field Fuse—7½ amps. (type 1A-7½).

Brush Spring Tension—10 to 13 oz. on each.

Armature—Auto-Lite, GAL-2121.

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton, No. 70726.

Location—Behind instrument board. Operated by pull knob.

Foot Dimming Switch—Soreng-Manegold, No. 2100-A.

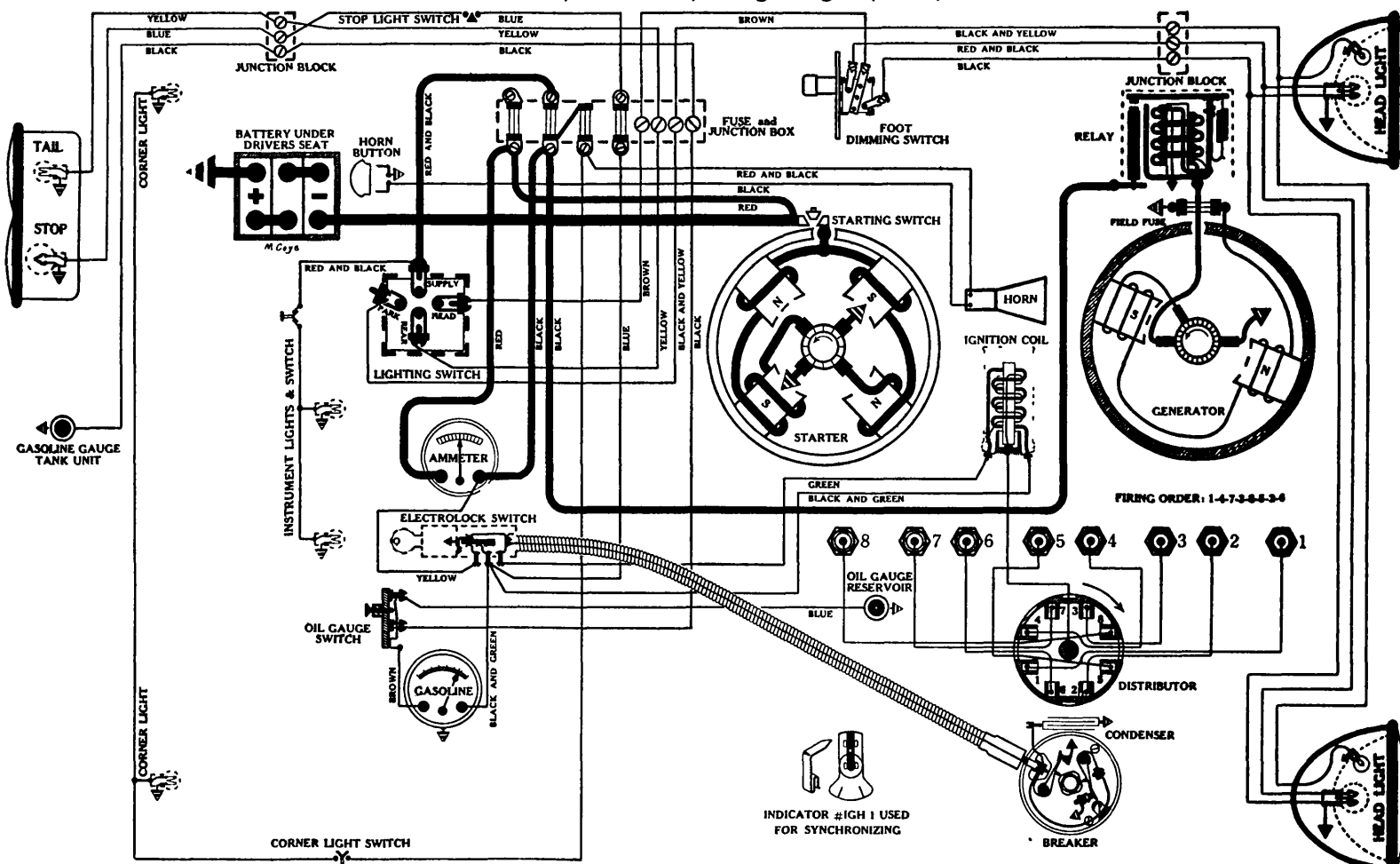
Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Fuses—Single 20 amp. fuse (type 3A-20), with spare, mounted on switch back.

Lamps—See Lamp Table, Sec. AA. HEAD—1000 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

HUPMOBILE

Model F, Series 222, Straight Eight (1932)



BATTERY

Willard, WH-2-15, 6 volts. Positive Terminal Grounded

Starting Capacity—140 amps. for 20 minutes.

Lighting Capacity—5.7 amps. for 20 hours.

Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite, MAD-4118

Connection to Engine—Bendix Drive.

Running Free—60 amps. at 5.5 volts, 3750 R.P.M.

Cranking Engine—165 to 175 amps. at 4.3 volts.

Lock Torque—13 pound-feet, 505 amps., 3 volts.

Brush Spring Tension—44 to 56 oz. on each.

Starting Switch—Auto-Lite, SW-3737-S, mounted on starter. Switch should not close with less than 2.3 lbs. pull applied at right angles to hole in extreme end of lever.

Armature—Auto-Lite, MAD-2083.

IGNITION

Rotation, R. H., Top View

Auto-Lite, IGH-4021

Breakers—Contact separation .020 inch.

Contact Spring Tension—17 to 19 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke, bring flywheel mark (found 1 3/4 inches, or 13 degrees, ahead of "1-8-DC"), so that it will register with center line of flywheel housing peep hole. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .061 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (Champion type C-7); Gap .028 to .030 inch.

Firing Order—1-4-7-3-8-5-2-6.

Manual Advance—26 degrees (on Flywheel).

Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1400	4	700	2
2000	8	1000	4
2600	12	1300	6
3200 (Max.)	16	1600	8

Ignition Coil—Auto-Lite, CE-4402.

Ignition Switch—"Electrolock," type 5-B. For details of operation and instructions on servicing, see "1928 Thief-Proof Lock Ignition Switch" page, Section AA.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4317 (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	500	6.5	14	1200	8.
2	550	6.9	16	1300	8.1
6	800	7.3	18	1450 (Max.)	8.8
10	1000	7.8			

Motoring Freely—5 1/2 amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 6 volts.

Field Test—5 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps. (type 1A-7 1/2).

Brush Spring Tension—22 to 25 oz. on main; 31 to 34 on third.

Armature—Auto-Lite, GAR-2181.

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4011

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. A-5670-A.

Location—Behind instrument board. Operated by pull knob.

Fuses—Three 15 amp. fuses (type 3A-15), with spare fuse in box under hood (left side).

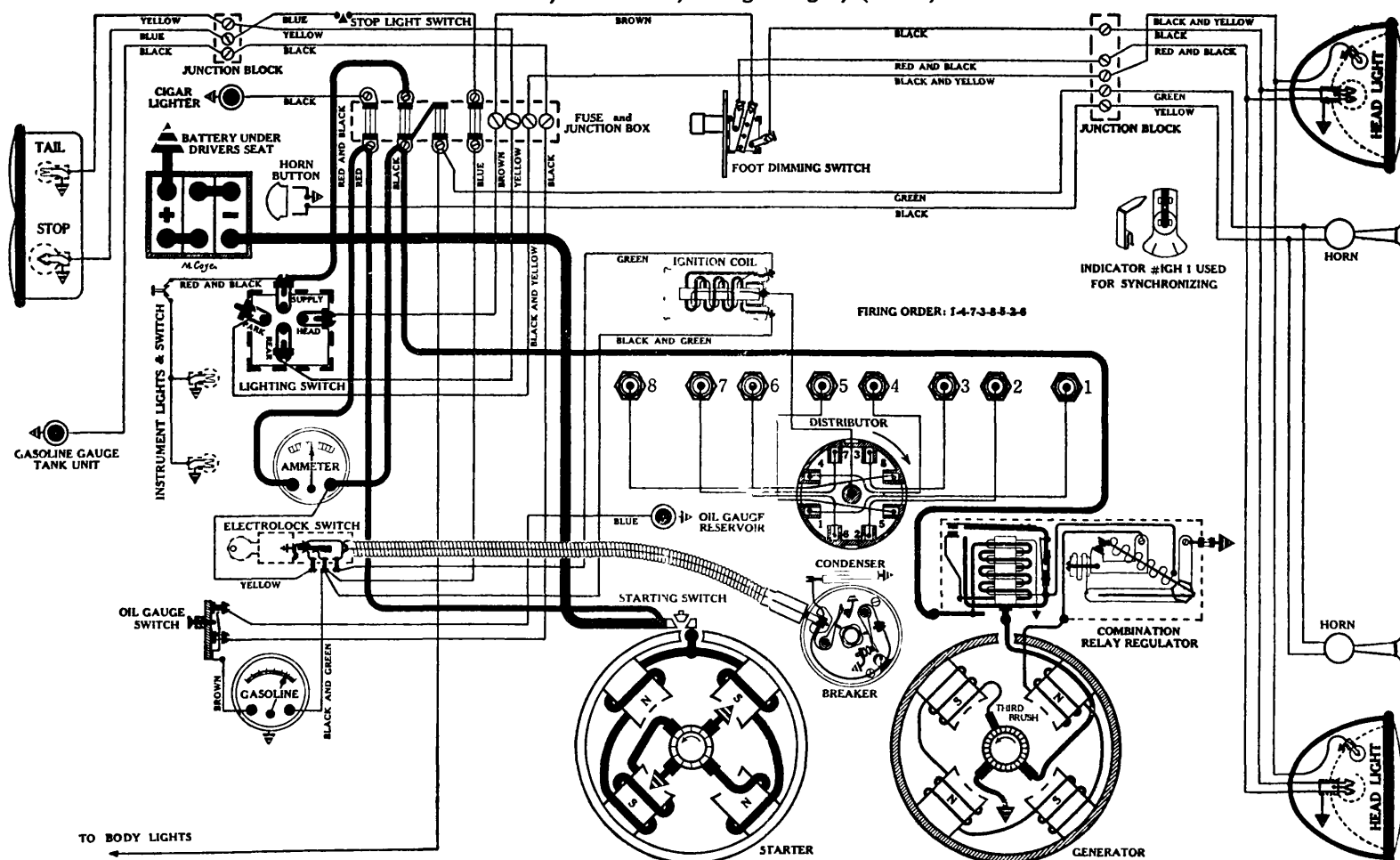
Foot Dimming Switch—Soreng-Manegold, No. 2100-A.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1000 (Bifocal); AUX.—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

HUPMOBILE

Model I, Series 226, Straight Eight, (1932)



BATTERY

Willard, WH-2-15, 6 volts. Positive Terminal Grounded

Starting Capacity—140 amps. for 20 minutes.

Lighting Capacity—5.7 amps. for 20 hours.

Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4042

Connection to Engine—Bendix Drive.

Running Free—46 amps. at 5½ volts, 4020 R.P.M.

Cranking Engine—170 to 185 amps. at 4.1 volts.

Lock Torque—17 pound-feet, 520 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (with new brushes).

Starting Switch—Auto-Lite, SW-3752-S, mounted on starter. Switch should not close with less than 5½ lbs. pull applied at right angles to hole in extreme end of lever.

Armature—Auto-Lite, MAB-2046.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGH-4021

Breakers—Contact separation .020 inch.

Contact Spring Tension—17 to 19 oz. on each

Synchronizing—Movable points open 45 degrees after stationary.

Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke, bring flywheel mark (found 1 inch, or 9 degrees, ahead of "1-8-DC"), so that it will register with center line of flywheel housing peep hole. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .029 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (Champion type C-7); Gap .028 to .030 inch.

Firing Order—1-4-7-3-8-5-2-6.

Manual Advance—26 degrees (on Flywheel).

Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1400	4	700	2
2000	8	1000	4
2600	12	1300	6
3200 (Max.)	16	1600	8

Ignition Coil—Auto-Lite, CE-4402.

Ignition Switch—"Electrolock", type 5-B. For details of operation and instructions on servicing, see "1928 Thief-Proof Lock Ignition Switch" page, Section AA.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAG-4138 (Driven by Timing Chain)

Regulation—Third brush in conjunction with Auto-Lite Voltage Regulator.

Performance Data—Gen. cold Regulator thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	525	6.6	12	850	7.9
4	600	7.1	16	1000	8.3
8	700	7.5	18	1400 (Max.)	8.3

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—3¾ amps. at 6 volts across field coils in series.

Field Fuse—7½ amps. (type 1A-7½), mounted in charge regulator.

Brush Spring Tension—22 to 27 oz. on each.

Armature—Auto-Lite, GAG-2099.

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

CHARGE REGULATOR AND RELAY

Auto-Lite, XA-407-BS

NOTE For special instructions on theory of operation and how to service regulator, see "Charge Regulator" page, Sec. AA.

Relay Closes—6½ to 7 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.015 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. A-5670 A.

Location—Behind instrument board. Operated by pull knob.

Fuses—Three 15 amp. fuses (type 3A-15), with spare in fuse box under hood (left side).

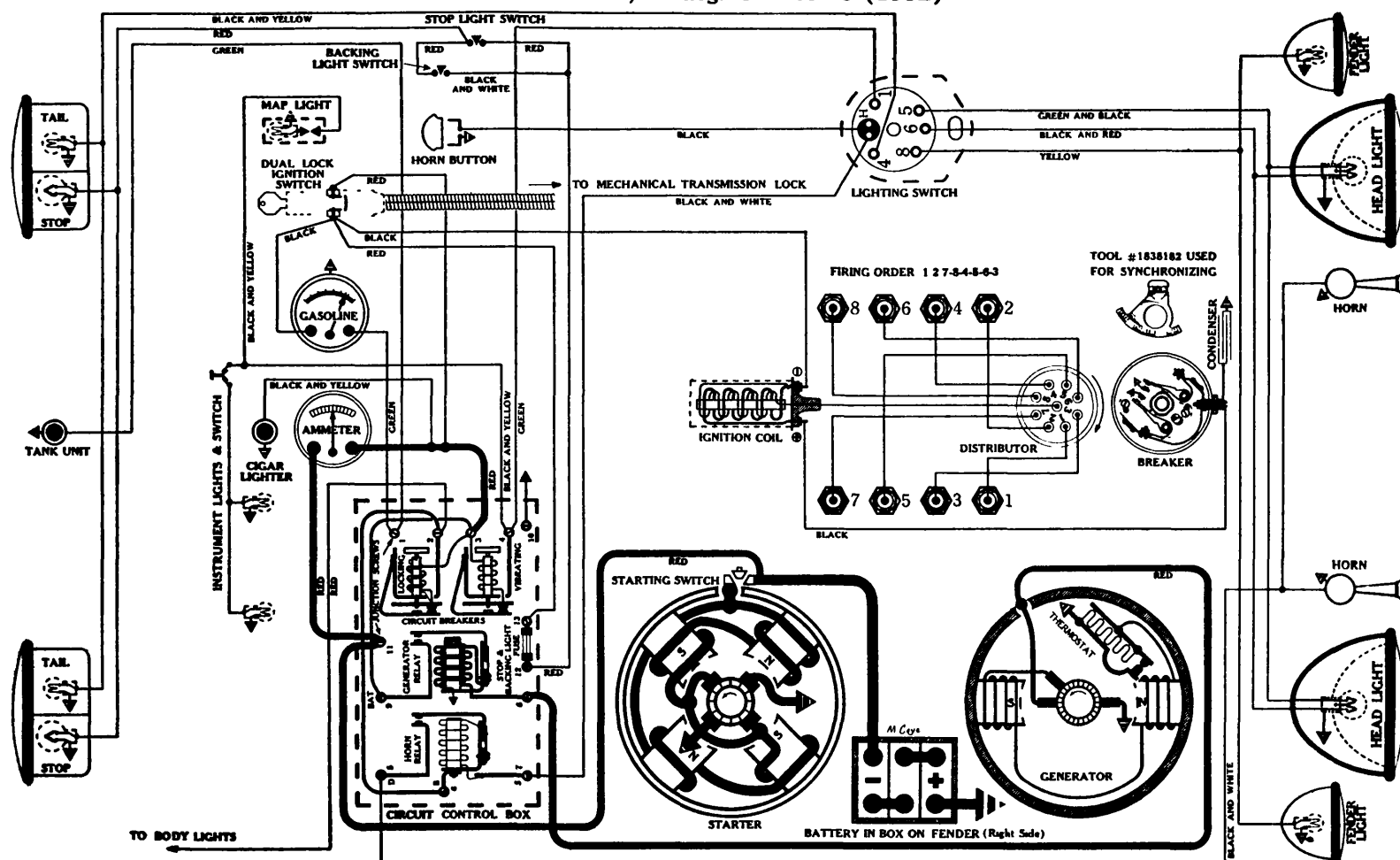
Foot Dimming Switch—Soreng-Manegold, No. 2100-A.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1000 (Bifocal); AUX.—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

LA SALLE

Model 345-B, 90 degree "Vee" 8 (1932)



BATTERY

Delco-Remy, 17-B, 6 volts. Positive Terminal Grounded

Starting Capacity—137 amps. for 20 minutes.

Lighting Capacity—6.5 amps. for 20 hours.

Box—Length, 11½; width, 7; height, 9¾ inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 728-P

Connection to Engine—Mechanical gear shift, incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter. Gear reduction job.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—245 to 260 amps. at 4 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 660-Y

(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Equal 45 degree intervals between interruptions.

Timing—With No. 1 piston on compression stroke, flywheel mark "IG-A" (which is 1-3/16 inches ahead of T.D.C.) opposite indicator, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 29. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .031 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (AC type D-8); Gap .025 to .028 inch.

Firing Order—1-2-7-8-4-5-6-3.

NOTE—All odd cylinder numbers on right bank, No 1 nearest radiator, all even numbers on left bank (see diagram).

Automatic Advance—20 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
500	Start	250	Start
1000	4	500	2
1500	8	750	4
2700	18	1350	9
2950 (Max.)	20	1475	10

Ignition Coil—Delco-Remy, 528-G.

Ignition Switch—Delco-Remy, 426-T "Dual Lock." (Combination

Ignition Switch and Mechanical Transmission Lock.)

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 927-S (Air Cooled)

Performance Data—Gen. cold. Thermostat closed.

Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	450	6.4	16	720	7.8
4	500	6.7	20	840	8.
8	540	7.	24	1400 (Max.)	8.4
12	600	7.4			

NOTE—Thermostat opens about 165° F, reducing charging rate approx 80 to 40%.

Motoring Freely—4½ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 6 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1843113.

Third Brush Adjustment—Loosen cover band. Loosen long hexagonal screw which releases third brush mounting plate, shift brush by hand; relock.

RELAY

Located in Delco-Remy, 480-Z Circuit Control Box, (together with Circuit Breakers and Horn Relay).

Mounted on Dash under Cowl

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-H.

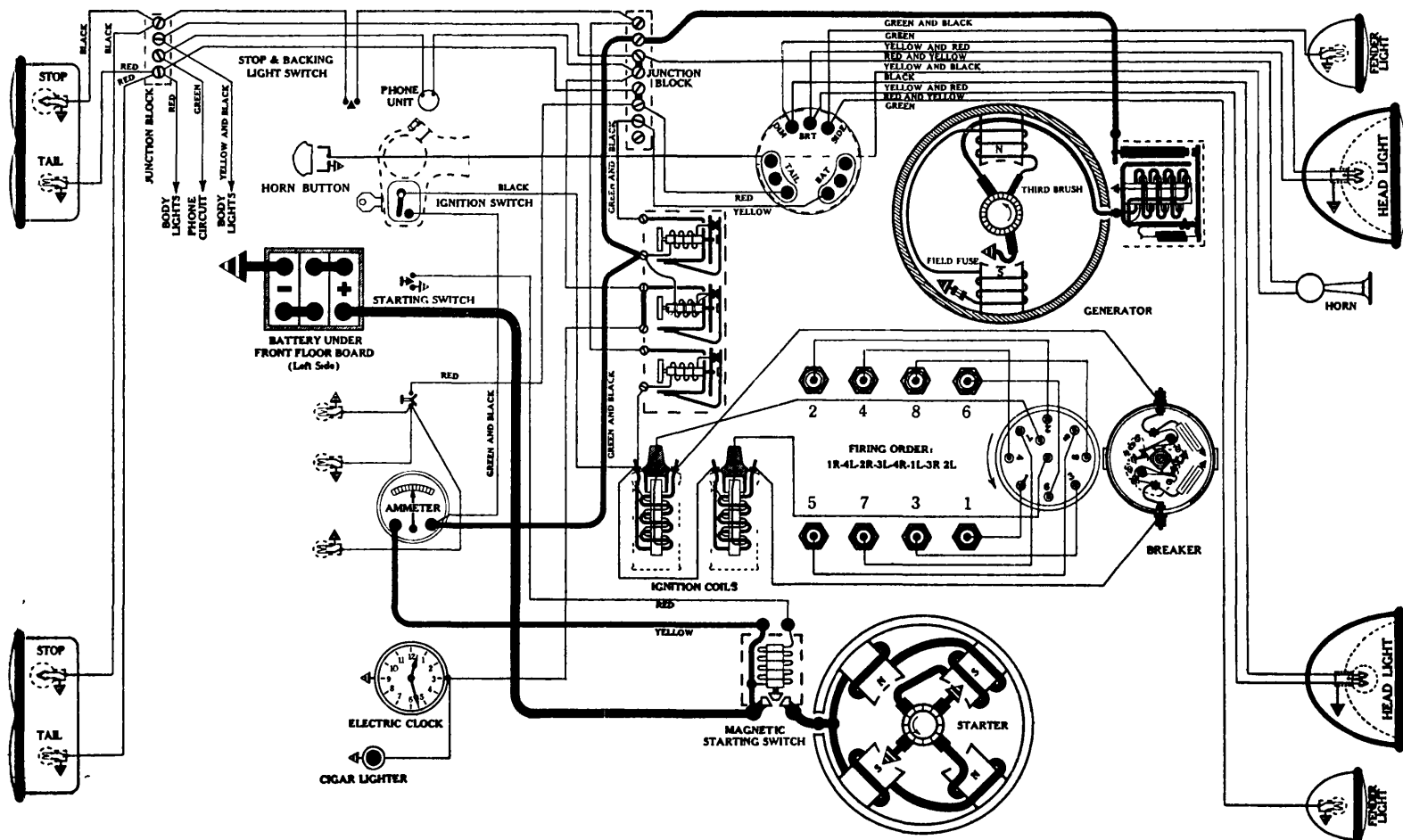
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Circuit Breakers—Vibrating unit. Starts 35 to 40 amps. Operates 5 to 15 amps. Lock out unit—opens 25 to 30 amps. Operates with discharge less than 1 amp.

Lamps—See Lamp Table, Sec. AA. HEAD—1000 (Bifocal); FENDER—63; MAP LIGHT—63; INSTRUMENT—63; DOME—81; TAIL—63; STOP AND BACK—87.

LINCOLN

Mod 1, 60 degree "Vee" 8, (1932)



BATTERY

Exide, 3-LXV-15-1RD, 6 volts. Negative Terminal Grounded
 Starting Capacity—150 amps. for 20 minutes.
 Lighting Capacity—6.6 amps. for 20 hours.
 Box—Length, 15½; width, 7; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAL-4001

Connection to Engine—Bendix Drive.
 Running Free—60 amps. at 6 volts.
 Cranking Engine—215 to 230 amps at 4.1 volts.
 Lock Torque—22 pound-feet, 550 amps. at 3 volts.
 Brush Spring Tension—44 to 48 oz. on each.
 Starting Switch—Eclipse Aviation Corp., type M-2583-A.
 Location—Mounted on starter. Magnetic type switch, controlled by press button on instrument board.
 Armature—Auto-Lite, MAL-2006.

IGNITION

Rotation, L. H., Top View
 Auto-Lite, IGL-4001-A

Breakers—Contact separation .020 inch.
 Contact Spring Tension—20 to 22 oz. on each.
 Synchronizing—Movable points open 60 degrees after stationary. Unequal intervals of 60-30-60, etc. degrees between interruptions. The stationary, or left hand set of breaker points, control the left hand ignition coil, which distributes current thru the "off-center" high tension terminal on the distributor cap, and fires the left bank, or even numbered cylinders.
 Timing—IMPORTANT! Time ignition in full advance position. Remove inspection cover on flywheel housing. Remove No. 2 spark plug, and slowly turn engine until No. 2 piston is coming up on compression stroke. Stop when flywheel mark "A-2" is opposite pointer. In this position the left hand or stationary set of breaker points should just open. If the ignition cam is in the correct position, the "off-center" end of rotor will almost line up with the left hand primary terminal. The line on flywheel marked "A-1" is for locating the position of (or synchronizing) the movable set of breaker points.

Timing with MOTOR GAUGE—Remove No. 2 spark plug, and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 2 piston is coming up on compression stroke. Stop when .019 inch before T.D.C., as indicated on Gauge. With spark in full advance position, "off-center" end of rotor opposite No. 2 Dist. Cap Terminal, the stationary set of breaker points should just open.

Spark Plugs—¾ inch (Champion type C-4); Gap .028 inch.

Firing Order—1R-4L-2R-3L-4R-1L-3R-2L.
 NOTE:—Cylinders on engine numbered as follows: From radiator back, Right Block—1-3-7-5; Left Block—6-8-4-2. High tension wires run from numbered terminals on Dist. Cap to corresponding numbers on cylinder block.

Manual Advance—20 degrees (on Fly wheel).
 Automatic Advance—26 degrees (on Fly wheel).
 Eng. R.P.M. Degrees Advance Dist. R.P.M.

(on flywheel)	Degrees Advance (on cam)
800	0
1200	2
1600	4
2000	6
2800	10½
3300 (Max.)	13

Ignition Coils—Auto-Lite, CE-4001-L.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAU-4001, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	550	6.4	12½	1000	7.6
2½	600	6.6	15	1200	7.8
6	700	7.1	16	1400	7.9
8½	800	7.2	17	1600 (Max.)	8.

Motoring Freely—3½ amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—2½ amps. at 6 volts, across field coils in series.

Field Fuse—7½ amps. (type 1A-7½), mounted in commutator end frame.

Brush Spring Tension—24 to 26 oz. on each.

Armature—Auto-Lite, GAU-2006.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand; mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014-L

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Special Lincoln design, made by Essex Wire Co.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

Circuit Breakers—Triple Combination.

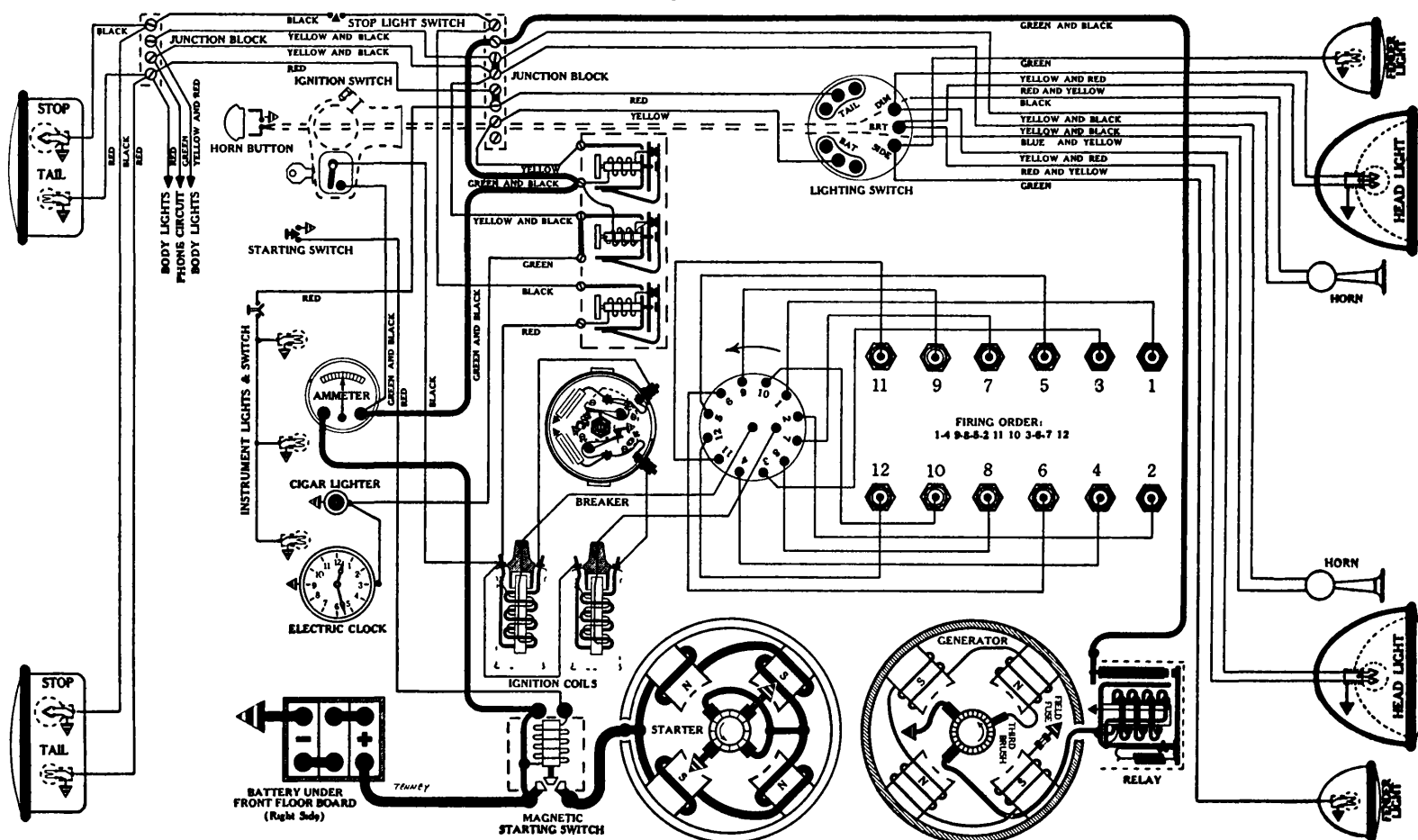
Vibrating—Starts 25 to 30 amps. Operates 10 to 15.

Lock-Out—Starts 25 to 30 amps. Operates with discharge less than 1 amp.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—81; INSTRUMENT—63; TAIL—63; DOME—63; STOP AND BACK—87.

LINCOLN

Model, 65 degree "Vee" 12 (1932)



BATTERY

Exide, 3-LXV-15-1RD, 6 volts. Negative Terminal Grounded
Starting Capacity—150 amps. for 20 minutes.
Lighting Capacity—6.6 amps. for 20 hours.
Box—Length, 15½; width, 7; height, 8-13/16 inches.

STARTER

**Rotation, L. H., Com. End
Auto-Lite, MAO-4001**

Auto-Lite, MAO-1001
Connection to Engine—Bendix Drive.
Running Free—50 amps. at 5½ volts.
Cranking Engine—200 to 225 amps. at 4.1 volts.
Lock Torque—35 pound-feet, 720 amps. at 3 volts
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Eclipse Aviation Corp., type M-2583-A.
Location—Mounted on starter. Magnetic type switch, controlled by
 press button on instrument board.
Armature—Auto-Lite, MAO-2006.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGM-4001

Breakers—Contact separation .018 inch.
Contact Spring Tension—20 to 22 oz. on each.
Synchronizing—Movable points open $32\frac{1}{2}$ degrees after stationary.
 Unequal intervals of $32\frac{1}{2}$ – $27\frac{1}{2}$ – $32\frac{1}{2}$, etc. degrees between interruptions. The stationary, or right hand set of breaker points, control the right hand ignition coil, which distributes current thru the “off-center” high tension terminal on the distributor cap, and fires the right bank or even numbered cylinders.

Timing—IMPORTANT! Time ignition in full advance position. Remove inspection cover on flywheel housing. Remove No. 2 spark plug, and slowly turn engine until No. 2 piston is coming up on compression stroke. Stop when flywheel mark "A-2" is opposite pointer. In this position the right hand, or stationary set of breaker points should just open. The line on flywheel marked "A-1" is for locating the position of (or synchronizing) the movable set of breaker points.

Timing with MOTOR GAUGE—Remove No. 2 spark plug, and attach MOTOR GAUGE, using adapter No 102 and rod No. 2. Slowly turn engine until No. 2 piston is coming up on compression stroke. Stop when .017 inch before T D.C., as indicated on Gauge. With spark in full advance position, "off-center" end of rotor opposite No. 2 Dist. Cap Terminal, the stationary set of breaker points should just open.

Spark Plugs— $\frac{7}{8}$ inch (Champion type C-4); Gap .028 inch.

Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.

NOTE—All odd cylinder numbers on left bank, No 1 nearest radiator. All even numbers on right bank (see diagram). High tension wires run from numbered terminals on Dist. Cap to corresponding numbers on cylinder blocks.

Initial Advance—20 degrees (on Flywheel).

Automatic Advance—23 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1200	4	600	2
2400	12	1200	6
3600	20	1800	10
4000 (Max.)	23	2000	11½

Ignition Coils—Auto-Lite, CE-4001-L.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

**Rotation, L. H., Com. End
Auto-Lite, GBC-4001**

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	400	6.4	16	720	7.6
4	460	6.7	20	980	7.8
8	520	7.	22	1250 (Max.)	8.
12	600	7.2			

Motoring Freely—4½ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 6 volts.

Field Test—27 amps at 6 volts across field coils in series.

Field Fuse—7½ amps. (type 1A-7½), mounted in commutator end frame.

Brush Spring Tension—24 to 26 oz. on each.

Armature—Auto-Lite, GBC-2006.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand; mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014-L

Closes—7 to 7½ volts.

Opens— $\frac{1}{2}$ to $2\frac{1}{2}$ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Special Lincoln design, made by Essex Wire Co.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

Circuit Breakers—Triple Combination.

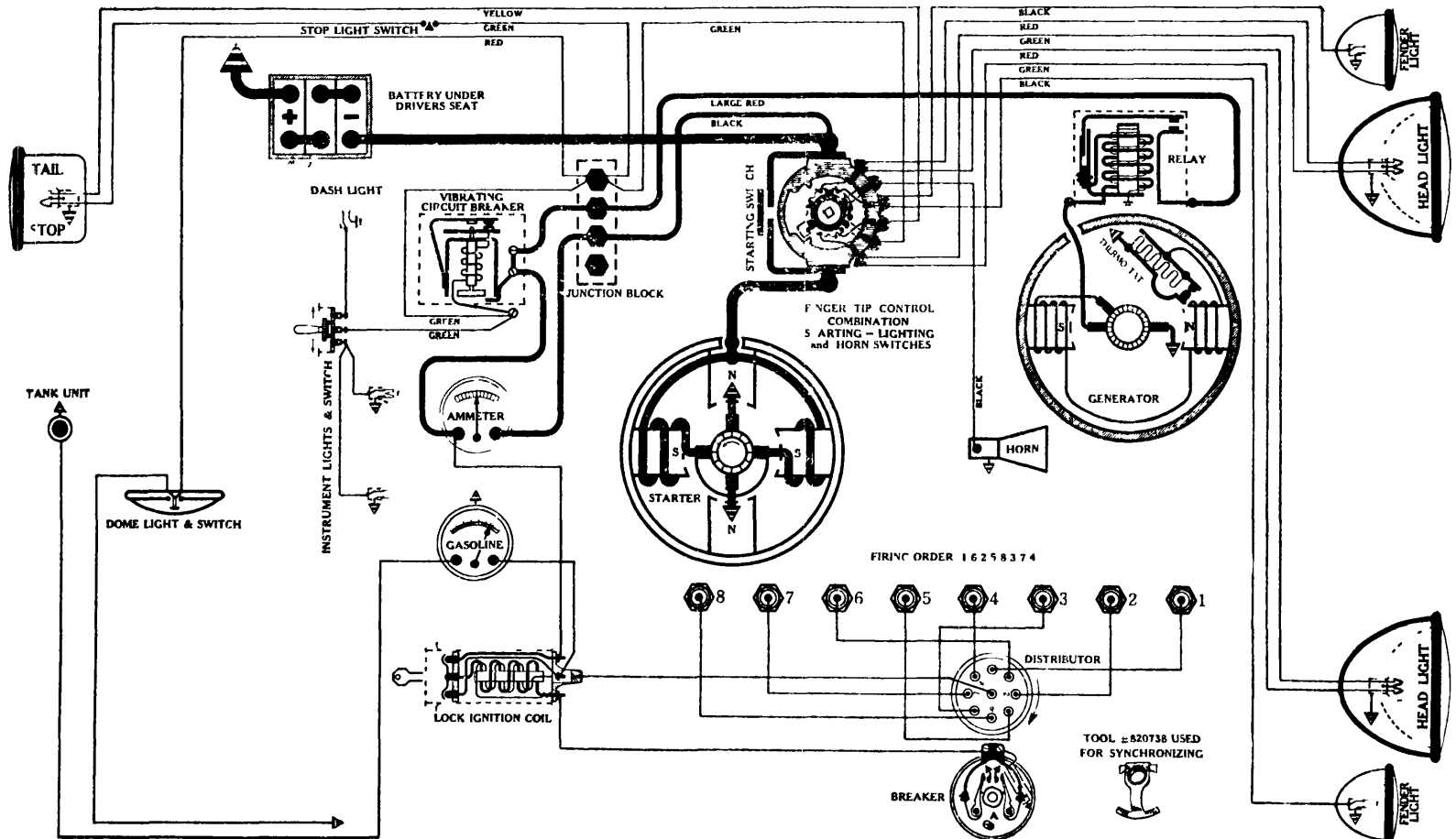
Vibrating—Starts 25 to 30 amps. Operates 10 to 15.

Lock-Out—Starts 25 to 30 amps. Operates with discharge less than 1 amp.

Lamps—See Lamp Table, Sec. AA. HEAD—1000 (Bifocal);
FENDER—81; INSTRUMENT—63; TAIL—63; DOME—63;
STOP—87.

MARMON

Model 70, Straight Eight, (1932)



BATTERY

National, H3-15X, 6 volts. Positive Terminal Grounded

Starting Capacity—114 amps for 20 minutes

Lighting Capacity—5 amps. for 20 hours.

Box—Length, 10½; width, 7¼; height, 9½ inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-C

Connection to Engine—Bendix Drive.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—175 to 180 amps. at 4.5 volts

Lock Torque—12 pound-feet, 475 amps., 3.6 volts

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Located foot of steering column. Operated by pulling up on horn button.

Armature—Delco-Remy, 818002.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 652-D

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary
Timing—With No. 1 piston on compression stroke, first bring flywheel mark "T.D.C. 1 & 8" opposite pointer. Turn flywheel back a distance of two teeth. With spark fully retarded, rotor opposite No. 1 Dist. Cap Terminal, stationary breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .018 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (Champion No. 8); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
900	Start	450	Start
1200	3	600	1½
1800	8	900	4
2400	14	1200	7
2800	17	1400	8½
3100 (Max.)	20	1550	10

Lock Ignition Coil—Delco-Remy, 526-P.

NOTE—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 965-M (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	480	6.4	16	975	7.7
4	550	7.	18	1300 (Max.)	8.
10	775	7.3			

NOTE—Thermostat opens about 167° F, reducing charging rate approx. 80 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4½ to 5 amps. at 6 volts, across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 1841982.

Third Brush Adjustment—Loosen cover band. See Fig. 22, Third Brush Adjustment page, Sec. AA.

RELAY
Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Pines Finger Tip Control, No. A-803.

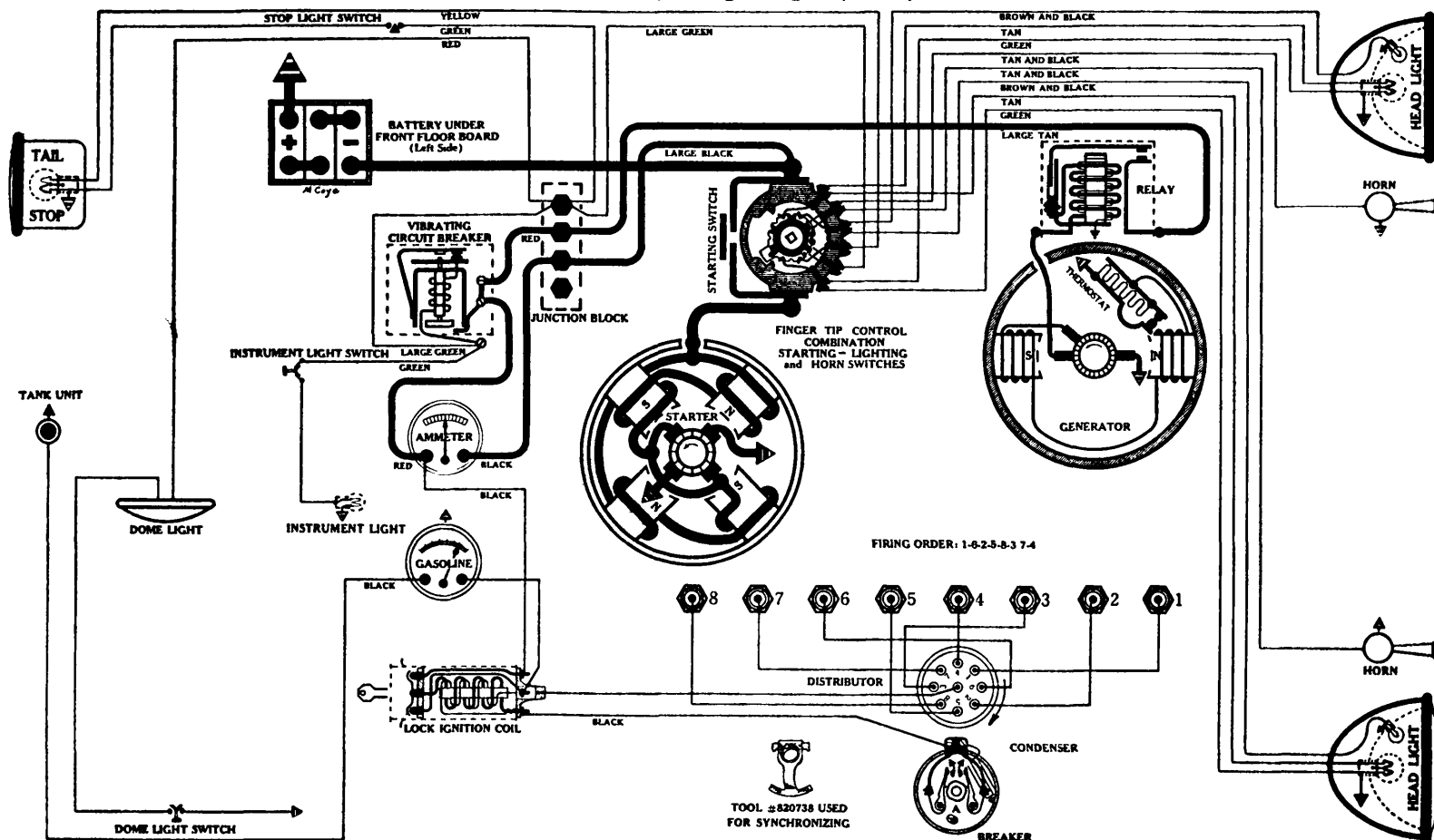
Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—64; STOP AND TAIL—1158.

MARMON

Model 125, Straight Eight (1932)



BATTERY

National, K-3-19-X, 6 volts. Positive Terminal Grounded

Starting Capacity—175 amps. for 20 minutes.

Lighting Capacity—7.6 amps. for 20 hours.

Box—Length, 13-3/16; width, 7 1/4; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 718-M

Connection to Engine—Bendix Drive.

Running Free—65 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—160 to 175 amps. at 4.3 volts.

Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Located foot of steering column. Operated by pulling up on horn button.

Armature—Delco-Remy, 818002.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 652-D

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—With No. 1 piston on compression stroke, first bring flywheel mark "T.D.C. 1 & 8" opposite pointer. Turn flywheel back a distance of two teeth. With spark fully retarded, rotor opposite No. 1 Dist. Cap Terminal, stationary breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .010 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (Champion No. 8); Gap. .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
900	Start	450	Start
1200	3	600	1 1/2
1800	8	900	4
2400	14	1200	7
2800	17	1400	8 1/2
3100 (Max.)	20	1550	10

Lock Ignition Coil—Delco-Remy, 526-P.

NOTE: This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire, to run engine. Coil has three "primary" terminals marked "Bat," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 965-L (Belt Drive)

Performance Data—Gen. cold. Thermostat closed		
Amps.	R.P.M.	Volts
0	480	6.4
4	550	7.
10	775	7.3
16	975	7.7
18	1300 (Max.)	8.

NOTE: Thermostat opens about 165° F, reducing charging rate approx 30 to 40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 1/2 to 5 amps. at 6 volts, across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 1841488.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Pines Finger Tip Control, No. A-803.

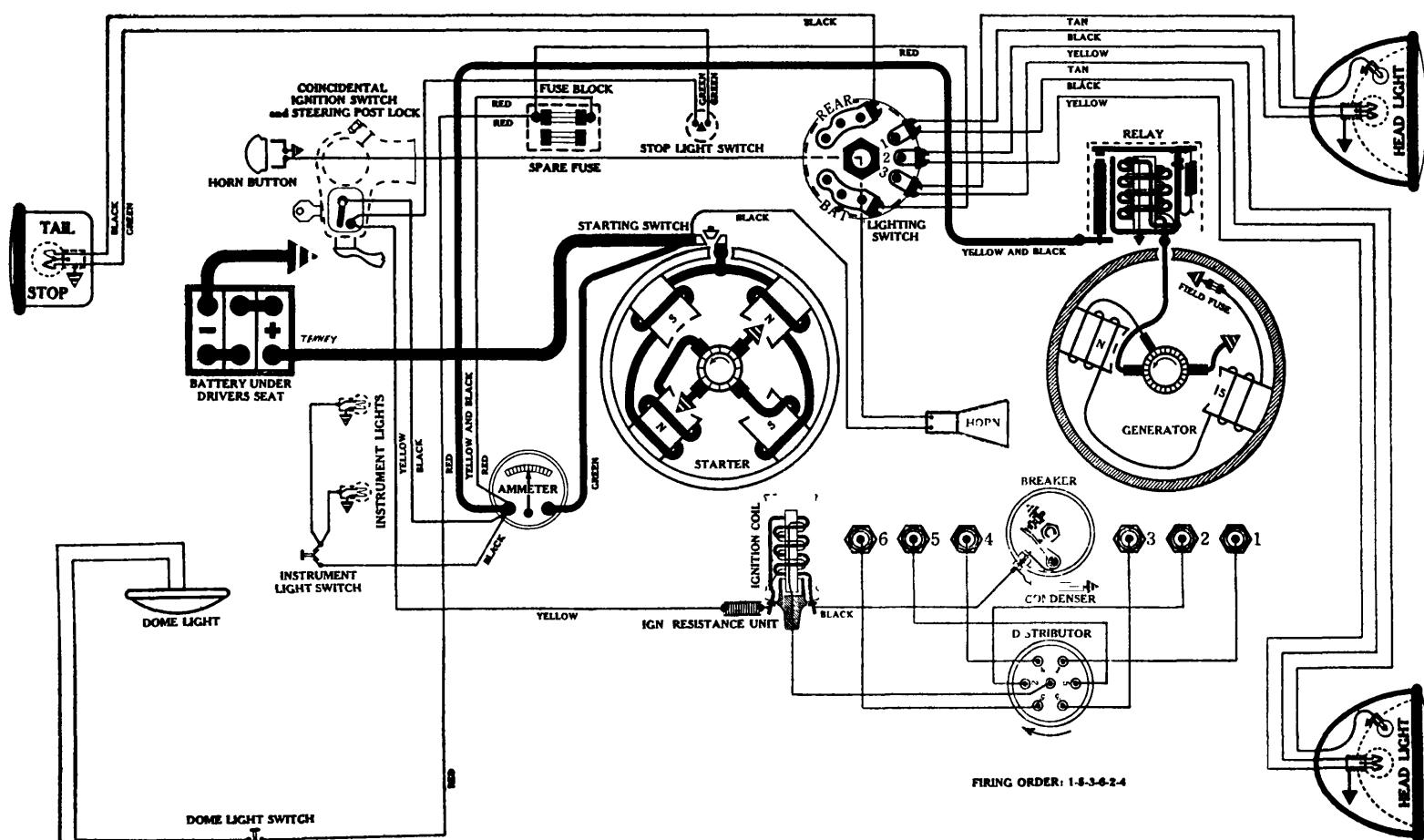
Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; INSTRUMENT—63; DOME—64; STOP AND TAIL—1158.

NASH

Mod 11060, Single Ignition Big Six, (1932)



BATTERY

U. S. L., HW-11-A, 6 volts. Negative Terminal Grounded

Starting Capacity—106 amps. for 20 minutes.

Lighting Capacity—4.8 amps. for 20 hours.

Box—Length, 9-1/16; width, 7 7/8; height, 9 1/8 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4026

Connection to Engine—Bendix Drive.

Running Free—46 amps. at 5.5 volts, 4020 R.P.M.

Cranking Engine—160 to 170 amps. at 4.2 volts.

Lock Torque—17 pound-feet, 520 amps. at 3 volts.

Brush Spring Tension—44 to 48 oz. on each.

Starting Switch—Auto-Lite, MAB-3080, mounted on starter. Switch should not close with less than 4 lbs. pull applied at right angles to hole in extreme end of lever.

Armature—Auto-Lite, MAB-2057.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGB-4071
(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Contact Spring Tension—17 to 19 oz.

Timing—With No. 1 piston on compression stroke, notch cut in flywheel opposite pointer, rotor opposite No. 1 Dist. Cap Terminal; breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .008 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (AC type G-10); Gap .020 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—28 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1000	4	500	2
1800	12	900	6
2600	20	1300	10
3400 (Max.)	28	1700	14

Ignition Coil—Auto-Lite, IG-4065.

Ignition Resistance Unit—Auto-Lite, IGB-2145.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4329, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.3	13	1200	7.5
6	800	6.9	15	1400	7.7
10	1000	7.1	17	1900 (Max.)	8.

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—4 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps. (type 1A-7 1/2).

Brush Spring Tension—10 to 13 oz. on each.

Armature—Auto-Lite, GAL-2006.

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold No. 4210-A.

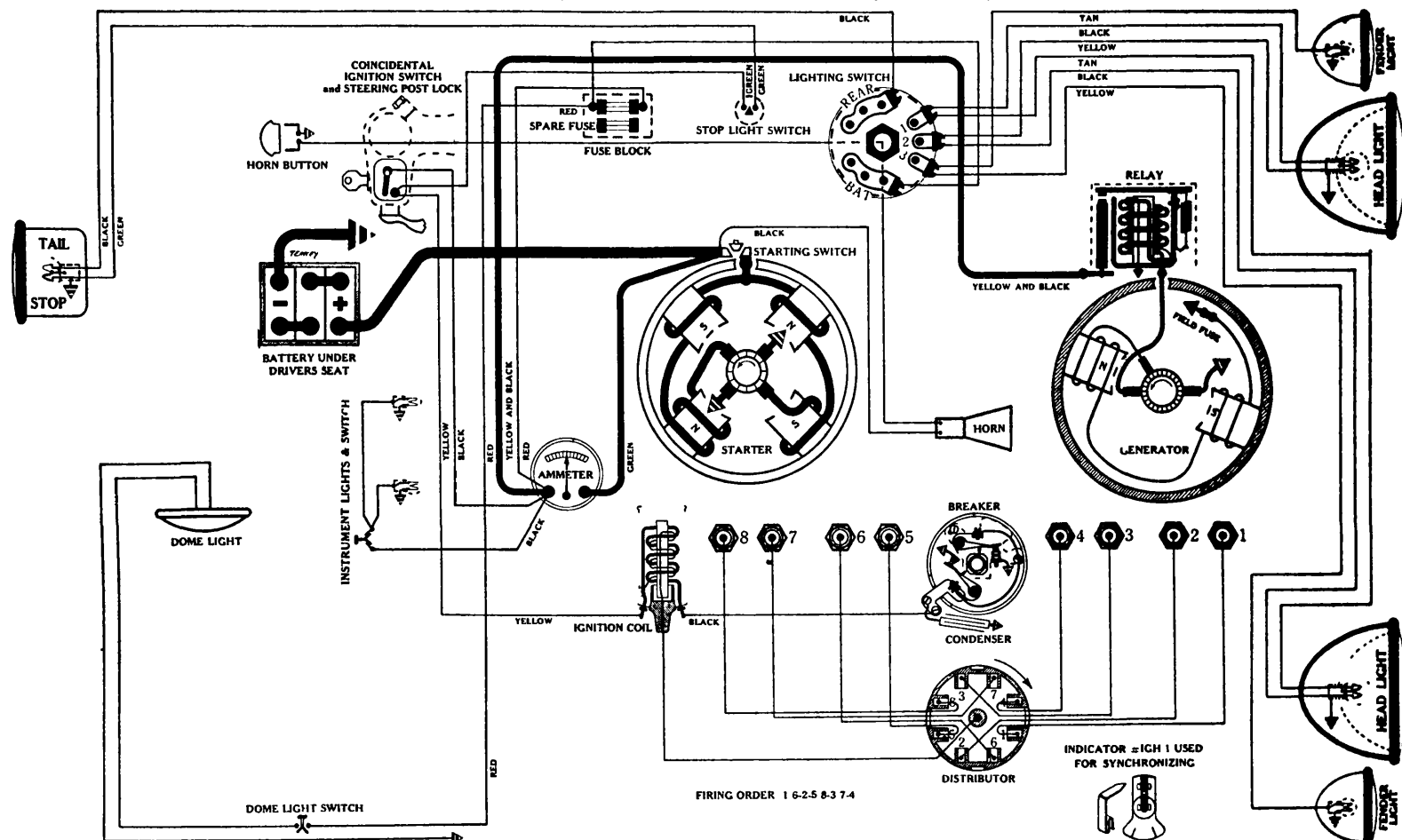
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20), with spare, mounted on dash, left side, under hood.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; DOME—64; INSTRUMENT—63; STOP AND TAIL—1158.

NASH

M d l 1070, Single Ignition Standard Eight (1932)



BATTERY

U.S.L., HW-13-A, 6 volts. Negative Terminal Grounded

Starting Capacity—127 amps. for 20 minutes.

Lighting Capacity—5.8 amps. for 20 hours.

Box—Length, 10-7/32; width, 7 1/2; height, 9 1/2 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite, MAB-4026

Connection to Engine—Bendix Drive.

Running Free—46 amps. at 5.5 volts, 4020 R.P.M.

Cranking Engine—160 to 170 amps at 4.1 volts.

Lock Torque—17 pound-feet, 520 amps. at 3 volts.

Brush Spring Tension—44 to 48 oz. on each.

Starting Switch—Auto-Lite, MAB-3080, mounted on starter. Switch should not close with less than 4 lbs. pull applied at right angles to hole in extreme end of lever.

Armature—Auto-Lite, MAB-2057.

IGNITION

Rotation, R. H., Top View

Auto-Lite, IGH-4017

(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch.

Contact Spring Tension—17 to 19 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—With No. 1 piston on compression stroke, notch cut in flywheel opposite pointer, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .008 inch before T D C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (AC type G-10); Gap .020 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—28 degrees (on Flywheel).

Eng R P M	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1000	4	500	2
1800	12	900	6
2600	20	1300	10
3400 (Max.)	28	1700	14

Ignition Coil—Auto-Lite, CE-4001.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAL-4329 (Belt Drive)

Performance Data—Gen. cold.

Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	600	6.3	13	1200	7.5
6	800	6.9	15	1400	7.7
10	1000	7.1	17	1900 (Max.)	8.

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—4 amps at 6 volts across field coils in series.

Field Fuse—7 1/2 amps. (type 1A-7 1/2).

Brush Spring Tension—10 to 13 oz. on each.

Armature—Auto-Lite, GAL-2006.

Third Brush Adjustment—Loosen cover band. See Fig. 18, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 4210-A.

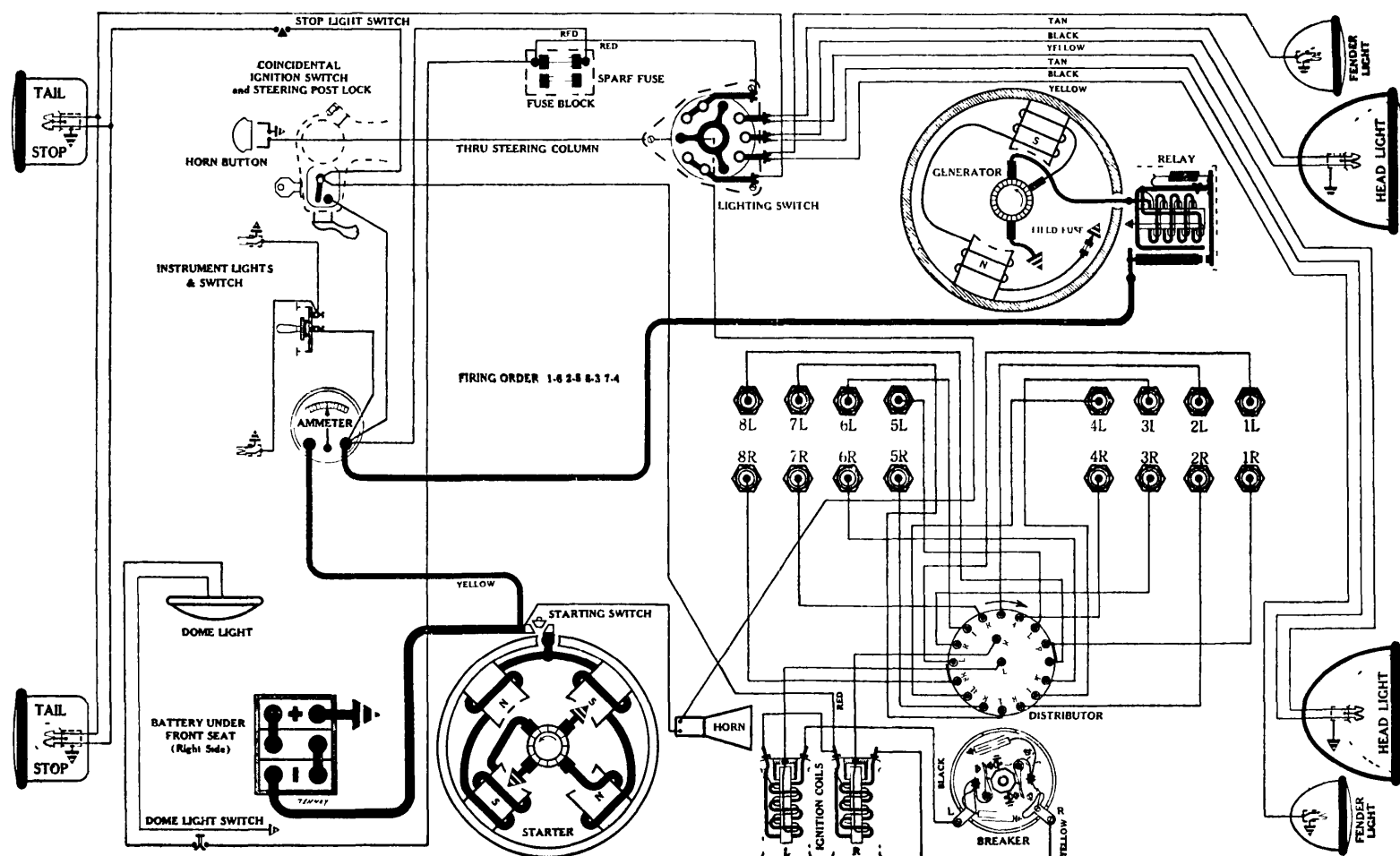
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20), with spare, mounted on dash, left side, under hood.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; DOME—64; INSTRUMENT—63; STOP AND TAIL—1158.

NASH

Mod 11080, Twin Ignition Special Eight, (1932)



BATTERY

U. S. L., HW-13-A, 6 volts. Positive Terminal Grounded
Starting Capacity—127 amps. for 20 minutes.
Lighting Capacity—5.8 amps. for 20 hours.
Box—Length, 10-7/32; width, 7%; height, 9% inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4033

Connection to Engine—Bendix Drive.
Running Free—46 amps. at 5.5 volts, 4020 R.P.M.
Cranking Engine—160 to 170 amps. at 43 volts.
Lock Torque—17 pound-feet, 520 amps. at 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Auto-Lite, MAB-2079-A, mounted on starter.
Switch should not close with less than 4 lbs. pull applied at right angles to hole in extreme end of lever.
Armature—Auto-Lite, MAB-2047.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGK-4004

Breakers—Contact separation .020 inch.
Contact Spring Tension—22 to 26 oz. on each.
NOTE—Contact spring tension exceptionally heavy. This tension must be maintained to insure smooth running and high speed performance.
Synchronizing—Adjust both breakers to open simultaneously.
Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke slowly turn engine until notch in flywheel marked "IGN" is opposite pointer in case. With rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using special attachment for adapter No. 113 and rod No. 37. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .072 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.
Spark Plugs—Special Metric (AC type K-12); Gap .020 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—20 degrees (on Flywheel).
Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	Start	200	Start
800	4	400	2
1200	8	600	4
1600	12	800	6
2000 (Max.)	16	1000	8

Ignition Coils—Auto-Lite, CE-4402.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAR-4205, (Belt Drive)

Performance Data—Gen. cold.					
Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	500	6.5	14	1200	8.
2	550	6.9	16	1300	8.1
6	800	7.3	18	1450 (Max.)	8.3
10	1000	7.8			

Motoring Freely—5½ amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 6 volts.

Field Test—5 amps. at 6 volts across field coils in series.

Field Fuse—7½ amps. (type 1A-7½).

Brush Spring Tension—22 to 25 oz. on main; 31 to 34 on third.

Armature—Auto-Lite, GAR-2214.

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-C.

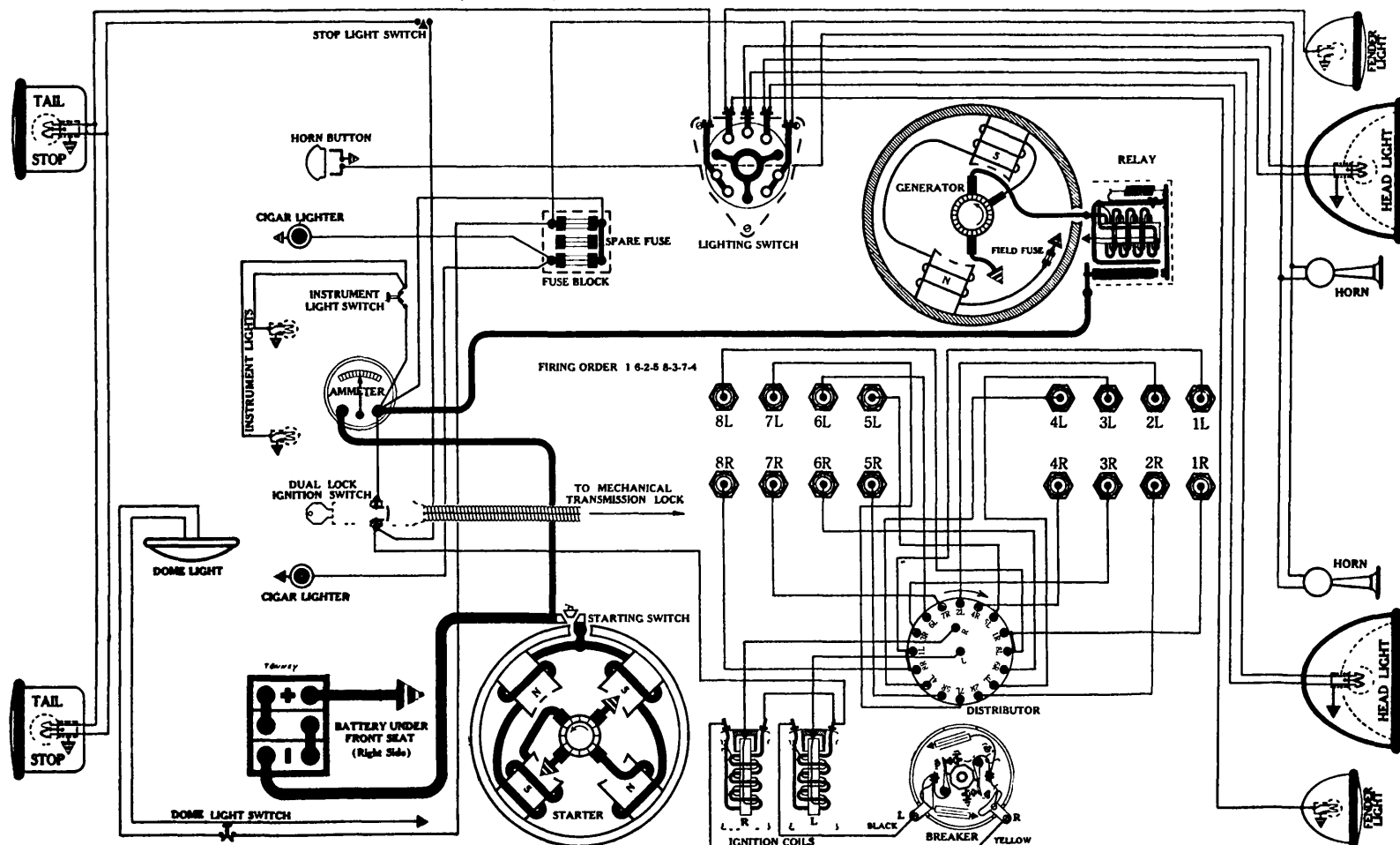
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20), with spare, mounted on dash, left side, under hood.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; DOME—64; INSTRUMENT—63; STOP AND TAIL—1158.

NASH

Model 1090, Twin Ignition Ambassador and Advanced Eights (1932)



BATTERY

Exide, 3-MXC-17-1, 6 volts. Positive Terminal Grounded
Starting Capacity—152 amps. for 20 minutes.
Lighting Capacity—6.6 amps. for 20 hours
Box—Length, 11 $\frac{1}{8}$; width, 7 $\frac{7}{8}$; height, 9-9/32 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4024

Connection to Engine—Bendix Drive.
Running Free—46 amps. at 5.5 volts, 4020 R.P.M.
Cranking Engine—160 to 170 amps. at 4.1 volts.
Lock Torque—17 pound-feet, 520 amps. at 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Auto-Lite, MAB-2079-S, mounted on starter.
Switch should not close with less than 4 lbs. pull applied at right angles to hole in extreme end of lever.
Armature—Auto-Lite, MAB-2073.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGK-4001

Breakers—Contact separation .020 inch.
Contact Spring Tension—22 to 26 oz. on each.
NOTE Contact spring tension exceptionally heavy. This tension must be maintained to insure smooth running and high speed performance.
Synchronizing—Adjust both breakers to open simultaneously.
Timing—IMPORTANT! Time ignition in full advance position.
With No. 1 piston on compression stroke slowly turn engine until notch in flywheel marked "IGN" is opposite pointer in case.
With rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 33. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .077 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.
Spark Plugs—Metric (AC type J-9); Gap .020 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—38 degrees (on Flywheel).
Automatic Advance—16 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist R.P.M.	Degrees Advance (on cam)
400	0	200	0
800	4	400	2
1200	8	600	4
1600	12	800	6
2000 (Max.)	16	1000	8

Ignition Coils—Auto-Lite, CE-4402.

Ignition Switch—Delco-Remy, 425-S, "Dual Lock." (Combination Ignition Switch and Mechanical Transmission Lock.)

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAR-4205 (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps	R.P.M.	Volts
0	500	6.5	14	1200	8.
2	550	6.9	16	1300	8.1
6	800	7.3	18	1450 (Max.)	8.3
10	1000	7.8			

Motoring Freely—5 $\frac{1}{2}$ amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 6 volts.

Field Test—5 amps. at 6 volts across field coils in series.

Field Fuse—7 $\frac{1}{2}$ amps. (type 1A-7 $\frac{1}{2}$).

Brush Spring Tension—22 to 25 oz. on main; 31 to 34 on third.

Armature—Auto-Lite, GAR-2214.

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 $\frac{1}{2}$ volts.

Opens— $\frac{1}{2}$ to 2 $\frac{1}{2}$ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-K.

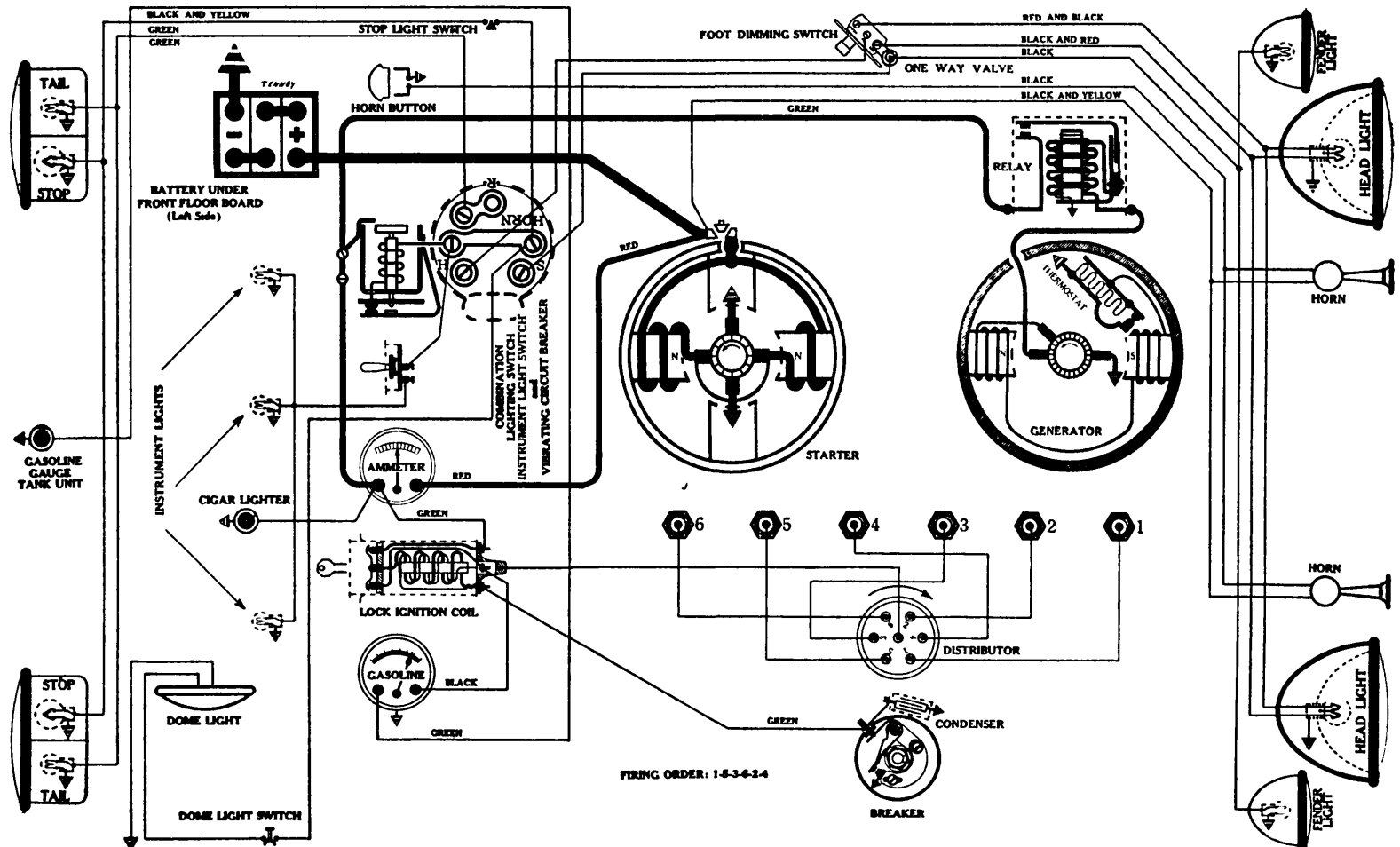
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two 20 amp. fuses (type 3A-20), with spare, mounted on dash, left side, under hood.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; DOME—64; INSTRUMENT—63; STOP AND TAIL—1158.

OLDSMOBILE

Model F-32, 6 cyl., (1932)



BATTERY

Delco-Remy, 13-C, 6 volts. Negative Terminal Grounded
Starting Capacity—117 amps. for 20 minutes.
Lighting Capacity—4.9 amps. for 20 hours.
Box—Length, 9-11/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 734-B

Connection to Engine—Mechanical gear shift, incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—175 to 180 amps. at 4.5 volts.
Lock Torque—12 pound-feet, 475 amps., 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 820052.
Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 632-P
(Full Automatic Spark Advance)

Breaker—Contact separation .022 inch.
Contact Spring Tension—18 to 20 oz.
Timing: NOTE—Two timing marks will be found on the outside rim of the vibration damper, and an indicating pointer is located on the front chain cover. The first mark to come under the pointer when engine is turned indicates .020 inches piston travel before T.D.C. The second mark indicates exact T.D.C., cylinders 1 and 6. With No. 1 piston coming up on compression stroke, stop when first mark is opposite pointer. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .020 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—Metric (AC type G-9); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Automatic Advance—28 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
900	4	450	2
1300	8	650	4
2000	16	1000	8
2300	20	1150	10
3000	28	1500	14

Lock Ignition Coil—Delco-Remy, 534-W.

NOTE—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 953-H, (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE—Thermostat opens about 165° F., reducing charging rate approx 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.
Max. Stall Current—18 to 20 amps. at 6 volts.
Field Test—4¼ to 5½ amps. at 6 volts across field coils in series.
Brush Spring Tension—16 to 18 oz. on each.
Armature—Delco-Remy, 1843403.
Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

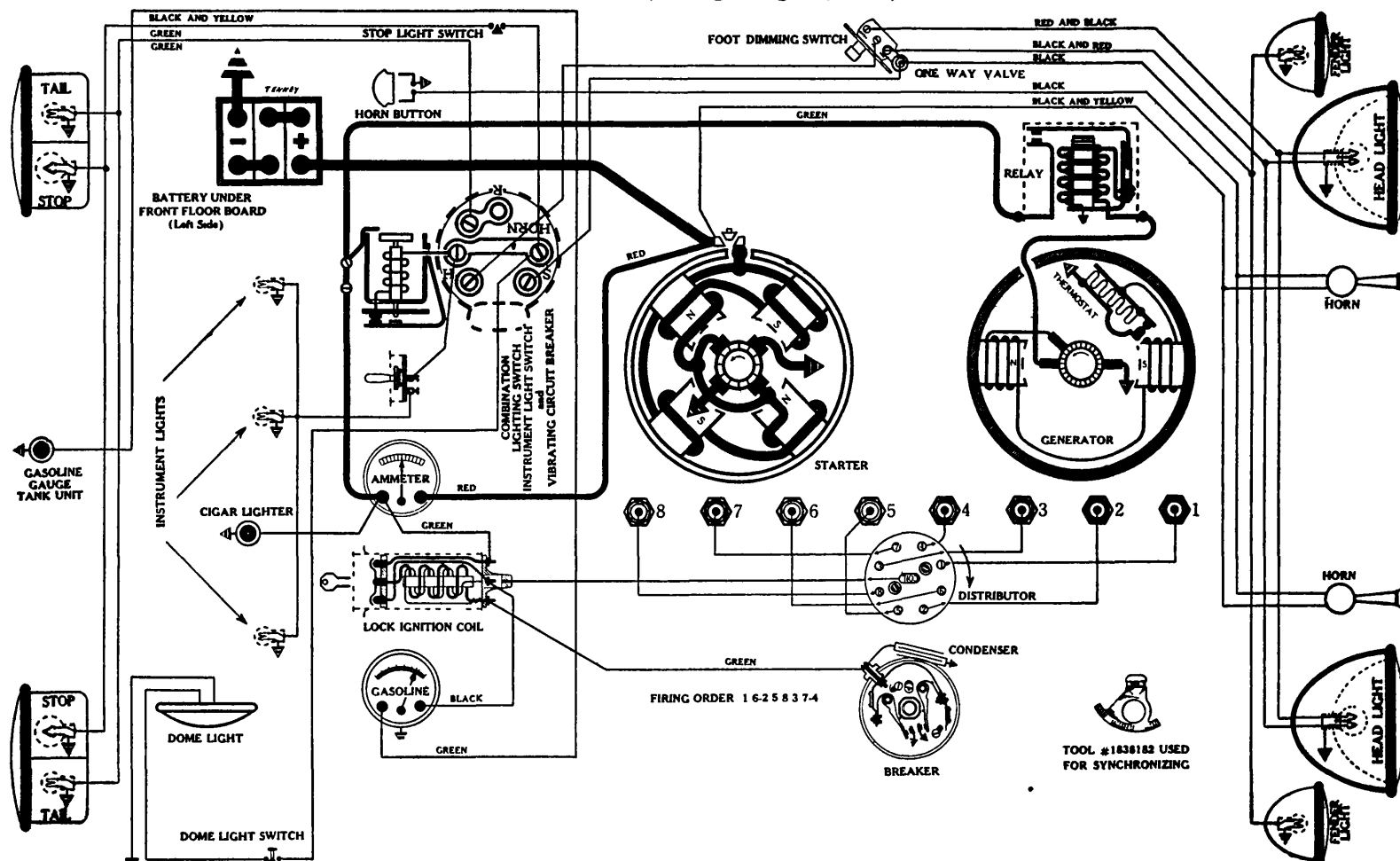
Closes—7 to 7½ volts.
Opens—0 to 2½ amps. discharge.
Contact Gap—.015 to .025 inch.
Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-J. Combination Lighting Switch, Current Limit Relay, and Instrument Light Switch.
Location—Behind instrument board, operated by pull knob.
Vibrating Circuit Breaker—Starts 25 to 30 amps. Operates 10 to 15 amps. discharge.
Foot Dimming Switch—Delco-Remy, 465-K.
Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.
Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; TAIL—63; INSTRUMENT—63; DOME—63; STOP—87.

OLDSMOBILE

Model L-32, Straight Eight (1932)



BATTERY

Delco-Remy, 13-E, 6 volts. Negative Terminal Grounded

Starting Capacity—117 amps. for 20 minutes.

Lighting Capacity—4.9 amps. for 20 hours.

Box—Length, 9-11/16; width, 7-1/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 725-R

Connection to Engine—Mechanical gear shift, incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps at 5 volts, 6000 R.P.M.

Cranking Engine—160 to 175 amps. at 4.3 volts.

Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 660-T

(Full Automatic Spark Advance)

Breakers—Contact separation .022 inch

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—NOTE: Two timing marks will be found on the outside rim of the vibration damper, and an indicating pointer is located on the front chain cover. The first mark to come under the pointer when engine is cranked indicates .020 inches piston travel before T.D.C. The second mark indicates exact T.D.C., cylinders 1 and 8. With No. 1 piston coming up on compression stroke stop when first mark is opposite pointer. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .020 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (AC type G-9); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—26 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
900	4	450	2
1300	8	650	4
2000	16	1000	8
2300	20	1150	10
2800 (Max.)	26	1400	13

Lock Ignition Coil—Delco-Remy, 534-W.

NOTE—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 953-H (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max.)	8.8
6	800	7.1	19	1700	8.8
11	1000	7.9			

NOTE—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4¼ to 5½ amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Armature—Delco-Remy, 1843403.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-J, Combination Lighting Switch, Current Limit Relay and Instrument Light Switch.

Location—Behind instrument board, operated by pull knob.

Vibrating Circuit Breaker—Starts, 25 to 30 amps. Operates 10 to 15 amps discharge.

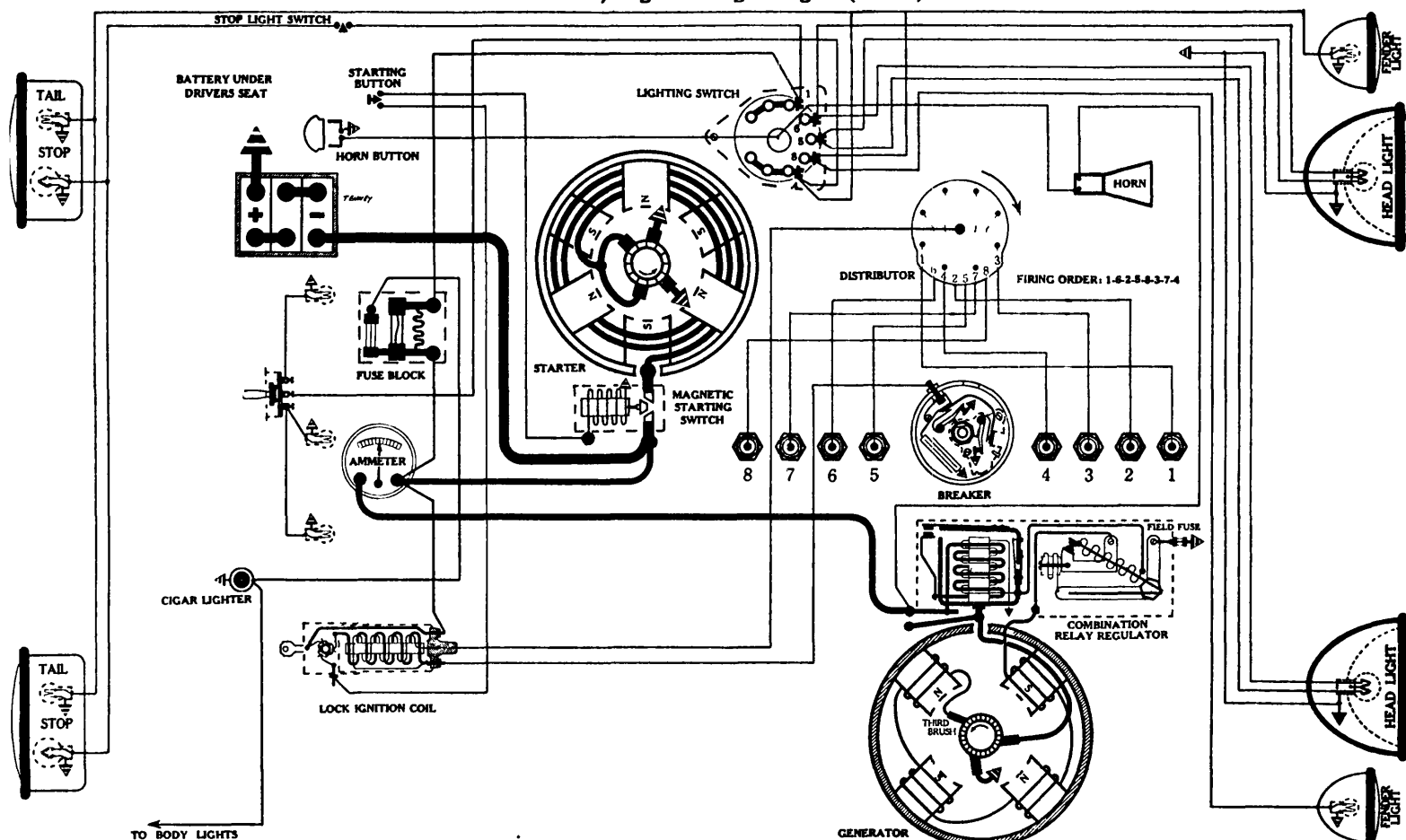
Foot Dimming Switch—Delco-Remy, 465-K.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; TAIL—63; INSTRUMENT—63; DOME—63; STOP—87.

PACKARD

Mod 1 900, Light Straight Eight (1932)



BATTERY

Prest-O-Lite, 6-19-ST, 6 volts. Positive Terminal Grounded
Starting Capacity—170 amps. for 20 minutes.
Lighting Capacity—7 amps. for 20 hours.
Box—Length, 13; width, 7; height, 9 1/2 inches.

STARTER

Rotation, L. H., Com. End
Owen-Dyneto, Type DI-1034

Connection to Engine—Bendix Drive.
Running Free—60 amps. at 6 volts, 4500 R.P.M.
Cranking Engine—260 to 280 amps. at 4 volts.
Lock Torque—25 pound-feet, 650 amps. at 3 1/2 volts.
Brush Spring Tension—26 to 28 oz. on each.
Starting Switch—Owen-Dyneto Magnetic type 21518. Location—
On starting motor, operated by push button on instrument board.
Armature—Owen-Dyneto, 13292.

IGNITION

Rotation, R. H., Top View
North East, Type 5031262
(Full Automatic Spark Advance)

NOTE This unit uses an EIGHT POINT CAM, and both sets of breaker arms operate simultaneously. Not necessary to synchronize to assure equal intervals between engine explosions.

Breakers—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz. on each.
Synchronizing—Adjust both breakers to open simultaneously.
Timing—IMPORTANT! Time ignition with locking plunger (found beside distributor grease cup) in full advance position. With No. 1 piston on compression stroke bring flywheel mark "Spark 1" opposite pointer. This mark is located 9 degrees ahead of flywheel mark "Upper D.C. cyl. No. 1." With rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .055 inch (low compression head), .031 inch (standard compression head), or .001 inch (high compression head), before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.
Spark Plugs—Special Metric (AC, type K-10); Gap .025 to .030 inch.
Firing Order—1-6-2-5-8-3-7-4.
Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
900	2	450	1
1200	5	600	2 1/2
1600	10	800	5
2000	16	1000	8
2200 (Max.)	20	1100	10

Lock Ignition Coil—North East, No. 5027936.

GENERATOR

Rotation, L. H., Com. End
Owen-Dyneto, Type CL-1005

IMPORTANT NOTE—The drive end generator bearing is part of engine. Do not run unit in test bench until special Dyneto bearing is attached.

Performance Data—Gen cold. Charge Regulator closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.5	12	1000	7.5
4	675	6.8	16	1350	7.9
8	800	7.2	18	1500 (Max.)	8

Motoring Freely—3 1/2 to 4 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—2 1/2 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5), mounted in charge regulator.

Brush Spring Tension—20 to 22 oz. on each.

Armature—Owen-Dyneto, 23214.

Third Brush Adjustment—Remove cover cap. See Fig. 25, "Third Brush Adjustment" page, Sec. AA.

CHARGE REGULATOR AND RELAY

Owen-Dyneto, Type 21732

NOTE For special instructions on theory of operation and how to service regulator, see "Charge Regulator" page, Sec. AA.

Relay Closes—6 1/2 to 7 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.015 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Culver-Stearns, G-841-A.

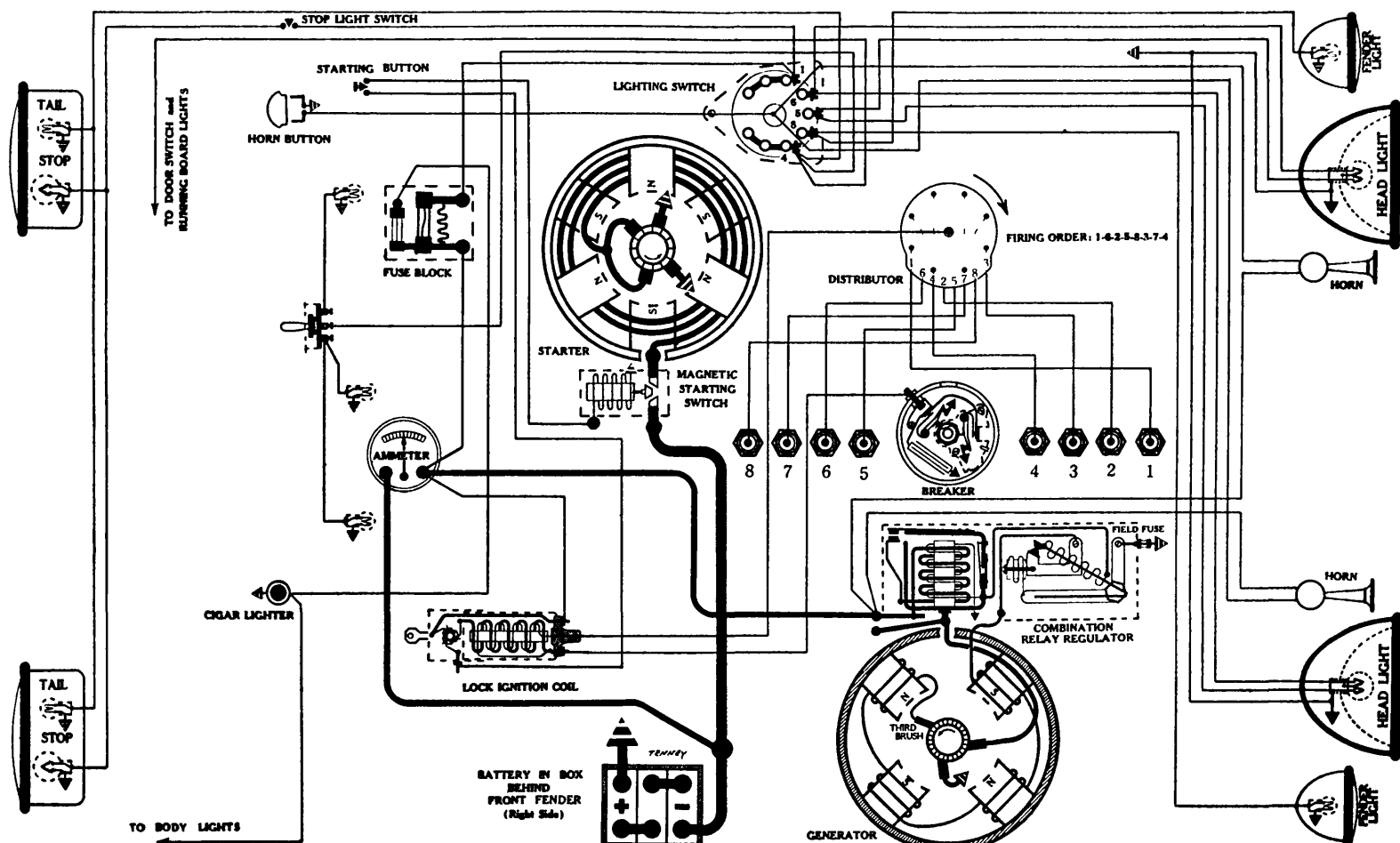
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two fuses mounted on North-East Fuse Block and Resistance Assembly, No. 5030861.

Lamps—See Lamp Table, Sec. AA HEAD—1000 (Bifocal); FENDER—63; INSTRUMENT—63; DASH—63; STOP—1129; TAIL—63.

PACKARD

Models 901 and 902, Small Straight Eights (1932)



BATTERY

Prest-O-Lite, A-6-17-SP, 6 volts. Positive Terminal Grounded
Starting Capacity—170 amps. for 20 minutes.
Lighting Capacity—6.6 amps. for 20 hours.
Box—Length, 13; width, 7; height, 9 $\frac{1}{2}$ inches.

STARTER

Rotation, L. H., Com. End
Owen-Dyneto, Type DI-1034

Connection to Engine—Bendix Drive.
Running Free—60 amps. at 6 volts, 4500 R.P.M.
Cranking Engine—260 to 280 amps. at 4 volts.
Lock Torque—25 pound-feet, 650 amps. at 3 $\frac{1}{2}$ volts.
Brush Spring Tension—26 to 28 oz. on each.
Starting Switch—Owen-Dyneto Magnetic type 21518. Location—
On starting motor, operated by push button on instrument board.
Armature—Owen-Dyneto, 13292.

IGNITION

Rotation, R. H., Top View
North East, Type 5028025

NOTE: This unit uses an EIGHT POINT CAM, and both sets of breaker arms operate simultaneously. Not necessary to synchronize to assure equal intervals between engine explosions.

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Adjust both breakers to open simultaneously.

Timing—IMPORTANT! Time ignition with locking plunger (found beside distributor grease cup) in retarded position. With No. 1 piston on compression stroke bring flywheel mark "Spark 1" opposite pointer. This mark is located 12 degrees ahead of flywheel mark "Upper D.C. cyl. No. 1." With rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .055 inch (low compression head), .031 inch (standard compression head), or .001 inch (high compression head), before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.

Spark Plugs—Special Metric (AC, type K-10); Gap .025 to .030 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
900	2	450	1
1200	5	600	2 $\frac{1}{2}$
1600	10	800	5
2000	16	1000	8
2200 (Max.)	20	1100	10

Lock Ignition Coil—North East, No. 5027936.

GENERATOR

Rotation, L. H., Com. End
Owen-Dyneto, Type CL-1005

IMPORTANT NOTE—The drive end Generator bearing is part of engine. Do not run unit in test bench until special Dyneto bearing is attached.

Performance Data—Gen. cold. Charge Regulator closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.5	12	1000	7.5
4	675	6.8	16	1350	7.9
8	800	7.2	18	1500 (Max.)	8.

Motoring Freely—3 $\frac{1}{2}$ to 4 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—2 $\frac{1}{2}$ amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5), mounted in charge regulator.

Brush Spring Tension—20 to 22 oz. on each.

Armature—Owen-Dyneto, 23214.

Third Brush Adjustment—Remove cover cap. See Fig. 25, "Third Brush Adjustment" page, Sec. AA.

CHARGE REGULATOR AND RELAY

Owen-Dyneto, Type 21732

NOTE: For special instructions on theory of operation and how to service regulator, see "Charge Regulator" page, Sec. AA.

Relay Closes—6 $\frac{1}{2}$ to 7 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.015 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Culver-Stearns, G-841-A.

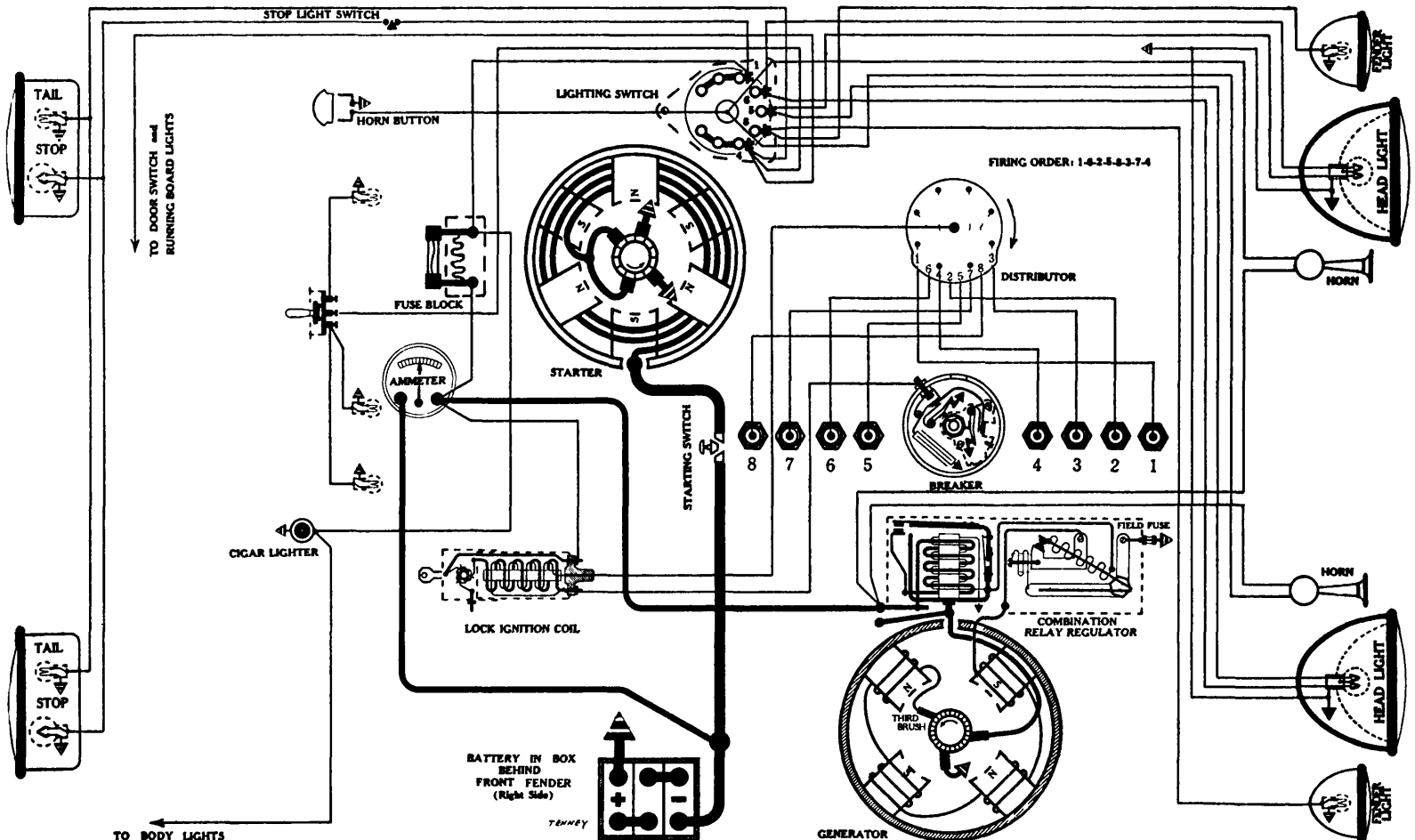
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—20 amp. fuse (type 5A-20), mounted on North East Fuse Block and Resistance Assembly No. 5021100.

Lamps—See Lamp Table, Sec. AA. HEAD—1000 (Bifocal); FENDER—63; INSTRUMENT—63; DASH—63; STOP—1129; TAIL—63.

PACKARD

Models 903 and 904, Big Straight Eights (1932)



BATTERY

Prest-O-Lite, A-6-17-SP, 6 volts. Positive Terminal Grounded
Starting Capacity—170 amps. for 20 minutes.
Lighting Capacity—6.6 amps. for 20 hours.
Box—Length, 13; width, 7; height, 9½ inches.

STARTER

Rotation, L. H., Com. End
Owen-Dyneto, Type DN-952

Connection to Engine—Bendix Drive.
Running Free—50 amps. at 6 volts, 3000 R.P.M.
Cranking Engine—290 to 300 amps. at 3¼ volts.
Lock Torque—35 pound-feet, 650 amps., 3½ volts.
Brush Spring Tension—26 to 28 oz. on each.
Armature—Owen-Dyneto, 13409.

IGNITION

Rotation, R. H., Top View
North East, Type 5028025

NOTE—This unit uses an EIGHT POINT CAM, and both sets of breaker arms operate simultaneously. Not necessary to synchronize to assure equal intervals between engine explosions.

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Adjust both breakers to open simultaneously.

Timing—**IMPORTANT!** Time ignition with locking plunger (found beside distributor grease cup) in retarded position. With No. 1 piston on compression stroke bring flywheel mark "Spark 1" opposite pointer. This mark is located 4 degrees ahead of flywheel mark "Upper D.C. cyl. No. 1." With rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .055 inch (low compression head), .031 inch (standard compression head), or .001 inch (high compression head), before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, both sets of breaker points should just open.

Spark Plugs—Special Metric (AC, type K-10); Gap .025 to .030 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
900	2	450	1
1200	5	600	2½
1600	10	800	5
2000	16	1000	8
2200 (Max.)	20	1100	10

Lock Ignition Coil—North East, No. 5027936.

GENERATOR

Rotation, L. H., Com. End
Owen-Dyneto, Type CL-1005

IMPORTANT NOTE The drive end generator bearing is part of engine. Do not run unit in test bench until special Dyneto bearing is attached.

Performance Data—Gen. cold. Charge Regulator closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.5	12	1000	7.5
4	675	6.8	16	1350	7.9
8	800	7.2	18	1500 (Max.)	8.

Motoring Freely—3½ to 4 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—2½ amps. at 6 volts across field coils in series.

Field Fuse—5 amps (type 1A-5), mounted in charge regulator.

Brush Spring Tension—20 to 22 oz. on each.

Armature—Owen-Dyneto, 23214.

Third Brush Adjustment—Remove cover cap. See Fig. 25, "Third Brush Adjustment" page, Sec. AA.

CHARGE REGULATOR AND RELAY

Owen-Dyneto, Type 21732

NOTE For special instructions on theory of operation and how to service regulator, see "Charge Regulator" page, Sec. AA.

Relay Closes—6½ to 7 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.015 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Culver-Stearns, G-841-A.

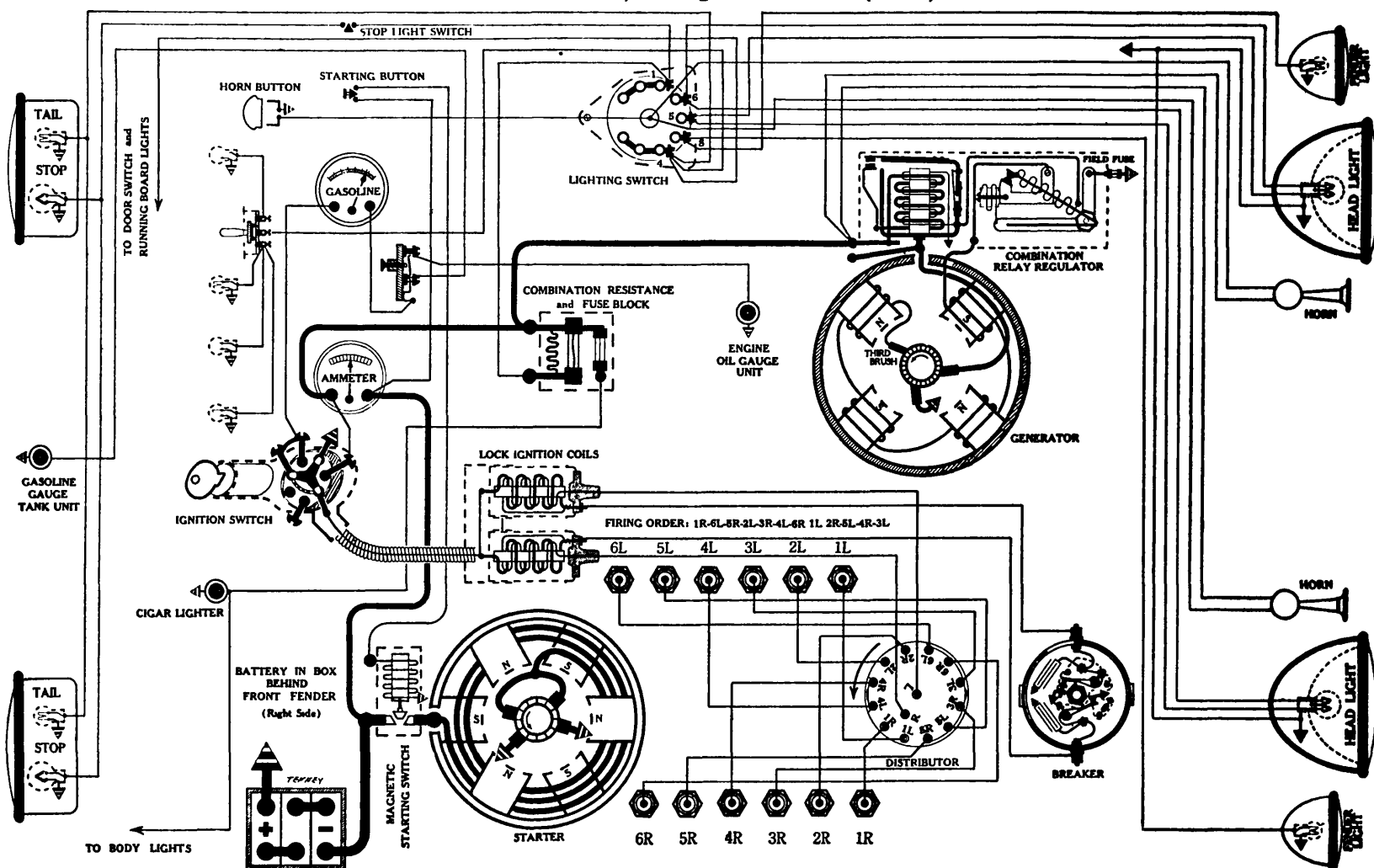
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—20 amp. fuse (type 5A-20), mounted on North East Fuse Block and Resistance Assembly, No. 5021100.

Lamps—See Lamp Table, Sec. AA. **HEAD**—1000 (Bifocal); **FENDER**—63; **INSTRUMENT**—63; **DASH**—63; **STOP**—1129; **TAIL**—63.

PACKARD

Models 905 and 906, 67 degree "Vee" 12 (1932)



BATTERY

Prest-O-Lite, A-6-17-SP, 6 volts. Positive Terminal Grounded
 Starting Capacity—170 amps. for 20 minutes.
 Lighting Capacity—6.6 amps. for 20 hours.
 Box—Length, 13; width, 7; height, 9 7/8 inches.

STARTER

Rotation, L. H., (om. End)
 Owen-Dyneto, Type DN-1072

Connection to Engine—Bendix Drive.
 Running Free—50 amps. at 6 volts, 3000 R.P.M.
 Cranking Engine—290 to 300 amps. at 3 3/4 volts.
 Lock Torque—35 pound-feet, 650 amps., 3 1/2 volts.
 Brush Spring Tension—26 to 28 oz. on each.
 Starting Switch—Owen-Dyneto Magnetic, type 21518. Location—on starting motor, operated by push button on instrument board.
 Armature—Owen-Dyneto, 13409.

IGNITION

Rotation, L. H., Top View
 Auto-Lite, IGO-4001
 (Full Automatic Spark Advance)

Breakers—Contact separation .018 inch
 Contact Spring Tension—20 to 22 oz. on each.
 Synchronizing—Unequal intervals of 33 1/2-26 1/2-33 1/2, etc. degrees between interruptions.

Timing—IMPORTANT! Time ignition with locking plunger (found beside distributor grease cup) in full advance position. With No. 1R piston coming up on compression stroke, bring flywheel mark "Spark 1R" opposite pointer. This mark is located 7 degrees ahead of flywheel mark "Upper D.C., cyls. 1 & 6R" With rotor opposite No. 1R Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1R spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 2. Slowly turn engine until No. 1R piston is coming up on compression stroke. Stop when .021 inch (equivalent to 7° advance on flywheel) before T.D.C., as indicated on Gauge—with rotor opposite No. 1R Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Special Metric (AC, type K-9); Gap .025 to .030 inch.

Firing Order—1R-6L-5R-2L-3R-4L-6R-1L-2R-5L-4R-3L.

Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
780	4	390	2
1100	8	550	4
1700	12	850	6
2100	14	1050	7
2800 (Max.)	16	1400	8

Lock Ignition Coil Assembly—Auto-Lite, CE-4020.

NOTE This is a new type Twin Lock Ignition Coil Assembly, operated by a remote control "Electrolock," type 16-S Ignition Switch.

GENERATOR

Rotation, L. H., Com. End

Owen-Dyneto, Type CL-1033 (Belt Drive)

Performance Data—Gen. cold. Charge Regulator closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.5	12	1000	7.5
4	675	6.8	16	1350	7.9
8	800	7.2	18	1500 (Max.)	8.

Motoring Freely—3 1/2 to 4 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—2 1/2 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5), mounted in charge regulator.

Brush Spring Tension—20 to 22 oz. on each.

Armature—Owen-Dyneto, 23421.

Third Brush Adjustment—Remove cover cap. See Fig. 25, "Third Brush Adjustment" page, Sec. AA.

CHARGE REGULATOR AND RELAY

Owen-Dyneto, Type 21732

NOTE For special instructions on theory of operation and how to service regulator, see "Charge Regulator" page, Sec. AA.

Relay Closes—6 1/2 to 7 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.015 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Culver-Stearns, G-841-A.

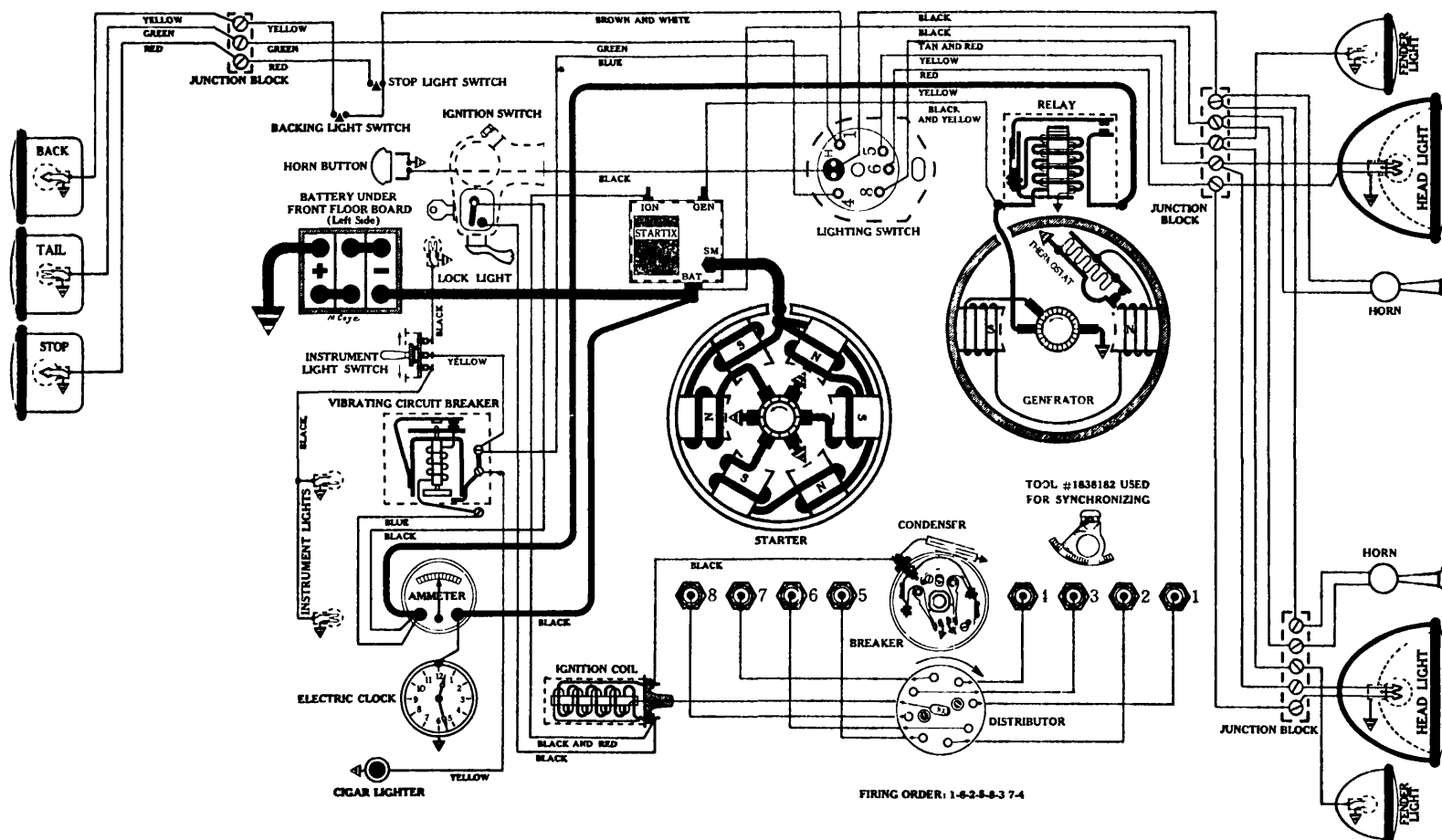
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two fuses mounted on North-East Fuse Block and Resistance Assembly, No. 5030861.

Lamps—See Lamp Table, Sec. AA. HEAD—1000 (Bifocal); FENDER—63; INSTRUMENT—63; DASH—63; STOP—1129; TAIL—63.

PIERCE-ARROW

Model 54, Straight Eight (1932)



BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded

Starting Capacity—160 amps. for 20 minutes.

Lighting Capacity—6.6 amps. for 20 hours.

Box—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 497

Connection to Engine—Bendix Drive.

Running Free—70 amps. at 5 volts, 3000 R.P.M.

Cranking Engine—230 to 245 amps. at 4.1 volts.

Lock Torque—19 pound-feet, 500 amps. at 3 volts.

Brush Spring Tension—36 to 40 oz. on each.

Starting Switch—"Startix," type D, Automatic Starting Switch and Anti-Stall Device, manufactured by the Eclipse Machine Corp., Elmira, N. Y. For complete details of operation and instructions on servicing see Sec. AA.

Armature—Delco-Remy, 1843420.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 660-P

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .023 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs— $\frac{3}{8}$ inch (Champion, type C-4); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—33 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1100	4	550	2
1640	8	820	4
2200	12	1100	6
2700	16	1350	8
3200 (Max.)	19½	1600	9½

Ignition Coil—Delco-Remy, 528-E.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-U (Belt Drive)

Performance Data—Gen. cold Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	14	1400	7.9
5	800	7.1	16	1600	8.
9	1000	7.5	18-20	1700 (Max.)	8.2
12	1200	7.8			

Motoring Freely—3 to 3½ amps. at 6 volts.

Max. Stall Current—19 to 21 amps. at 6 volts.

Field Test—2 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1839078.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-U.

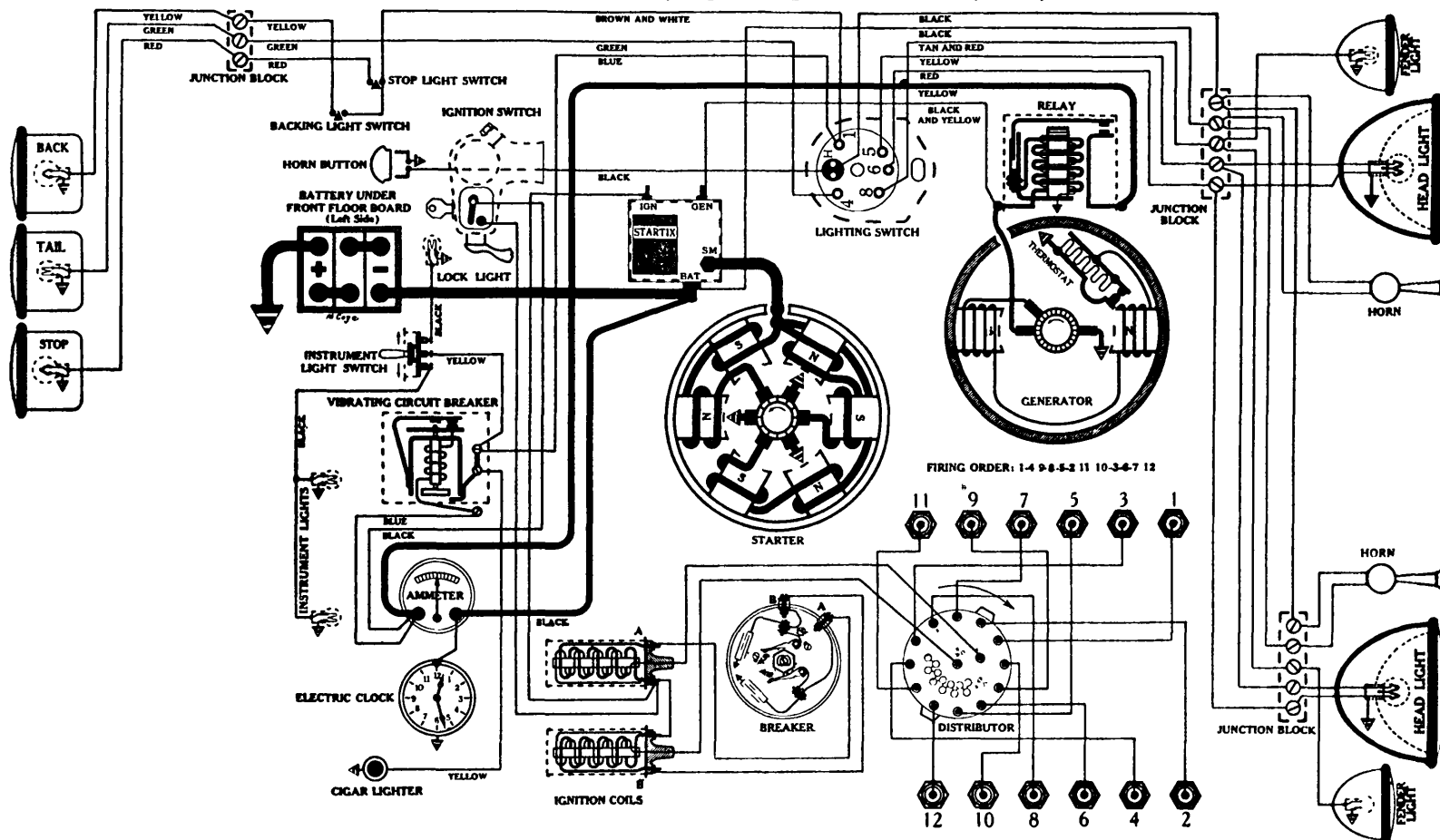
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410 F. Starts 30 to 35 amps. Operates 5 to 18 amps.

Lamps—See Lamp Table, Sec. AA. HEAD—1123 (Bifocal); FENDER—81; DASH—63; DOME—87; TONNEAU—81; BACK—1129; STOP—1129; TAIL—81.

PIERCE - ARROW

Models 51, 52 and 53, Eighty degree "Vee" 12 (1932)



BATTERY

Willard, WH-5-19, 6 volts. Positive Terminal Grounded

Starting Capacity—180 amps. for 20 minutes.

Lighting Capacity—7.6 amps. for 20 hours.

Box—Length, 13; width, 7-1/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 498

Connection to Engine—Bendix Drive.

Running Free—70 amps. at 5 volts, 3000 R.P.M.

Cranking Engine—230 to 245 amps. at 4.1 volts.

Lock Torque—19 pound-feet, 500 amps. at 3 volts.

Brush Spring Tension—36 to 40 oz. on each.

Starting Switch—"Startix," type D, Automatic Starting Switch and Anti-Stall Device, manufactured by the Eclipse Machine Corp., Elmira, N. Y. For complete details of operation and instructions on servicing, see Sec. AA.

Armature—Delco-Remy, 1843420.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 4096

Breakers—Contact separation .018 inch.

NOTE:—Due to the peculiar design of the ignition cam, to insure good high speed performance the contact separation must be accurately adjusted to .018 inch and no more.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 20 degrees after stationary. Unequal intervals of 20-40-20, etc. degrees between interruptions.

Timing—IMPORTANT: Time ignition in full advance position. Slowly turn engine until No 1 piston (left bank) is coming up on compression stroke. Stop when flywheel mark "Ign No 1" is directly in line with pointer, at flywheel inspection hole. With rotor under No 1 Dist Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No 1 spark plug and attach MOTOR GAUGE, using adapter No 114 and rod No 29. Slowly turn engine until No 1 piston is coming up on compression stroke. Stop when 022 inch before T.D.C. as indicated on Gauge. With rotor under No 1 Dist Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Special Metric (AC, type K-12); Gap .025 inch.

Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.

NOTE:—All odd cylinder numbers on left bank, No 1 nearest radiator. All even numbers on right bank (see diagram).

Manual Advance—33 degrees (on Flywheel).

Automatic Advance—14 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1300	4	650	2
2000	8	1000	4
2700	12	1350	6
3000 (Max.)	14	1500	7

Ignition Coils—Delco-Remy, 528-E.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-U (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	14	1400	7.9
5	800	7.1	16	1600	8.
9	1000	7.5	18-20	1700 (Max.)	8.2
12	1200	7.8			

Motoring Freely—3 to 3 1/2 amps. at 6 volts.

Max. Stall Current—19 to 21 amps. at 6 volts.

Field Test—2 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1839078.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-U.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-F. Starts 30 to 35 amps. Operates 5 to 18 amps.

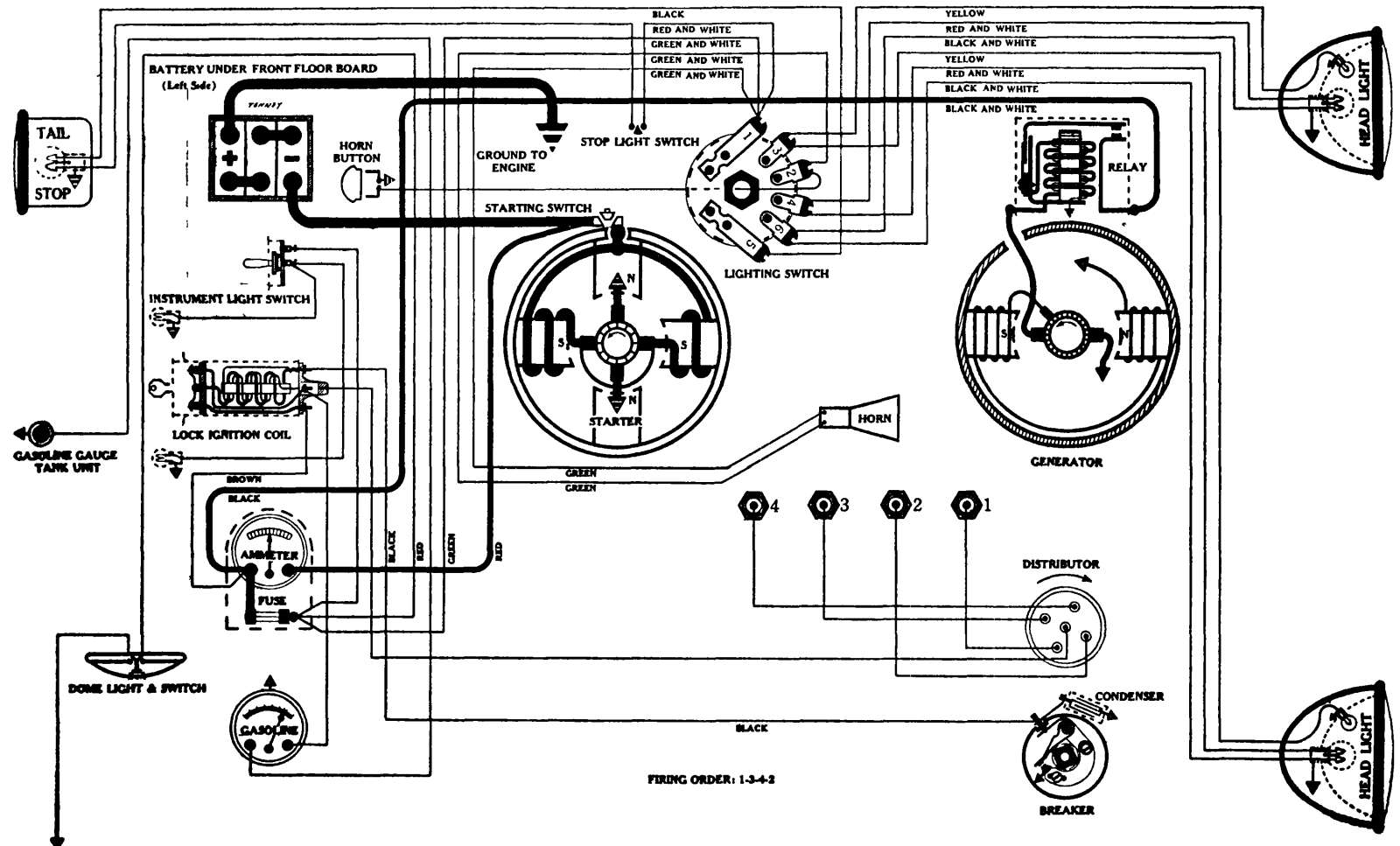
Lamps—See Lamp Table, Sec. AA. HEAD—1133 (Bifocal);

FENDER—81; DASH—63; DOME—87; TONNEAU—81; BACK—1129; STOP—1129; TAIL—81.

PLYMOUTH

"Floating Power," Mod 1 PA, 4 cyl., (Early 1932)

NOTE:—The car wiring of the 1932 Plymouth "Thrifty" model, announced Feb. 22, 1932, is as shown, with exception of the dome light and electric gasoline gauge circuits, which units are not supplied. The same Delco-Remy, 629-H Distributor is used, but without the vacuum retard. All other electrical units are the same.



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—98 amps. for 20 minutes.

Lighting Capacity—4.9 amps. for 20 hours.

Box—Length, 9-1/16; width, 7-1/16; height, 8 7/8 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 714-Q

Connection to Engine—Mechanical gear shift incorporating over-running disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—160 to 180 amps. at 4.2 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 629-H

(Full Automatic Spark Advance in conjunction with Delco-Remy, 680-A Vacuum Retard)

Breaker—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .046 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (AC type G-12); Gap .022 inch.

Firing Order—1-3-4-2.

Vacuum Retard—20 degrees (on Flywheel).

Automatic Advance—14 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1300	4	650	2
1600	6	800	3
2100	10	1050	5
2400	12	1200	6
2600 (Max.)	14	1300	7

Lock Ignition Coil—Delco-Remy, 526-T.

NOTE:—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked. On "Thrifty" model, no wire is connected to "Gauge" terminal.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 943-R, (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	15	1400	8.
5	1000	7.2	17	2000 (Max.)	8.2
11	1200	7.9			

Motoring Freely—4 to 5 amps. at 6 volts.

Max. Stall Current—19 to 20 amps. at 6 volts.

Field Test—3 1/2 to 4 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9271.

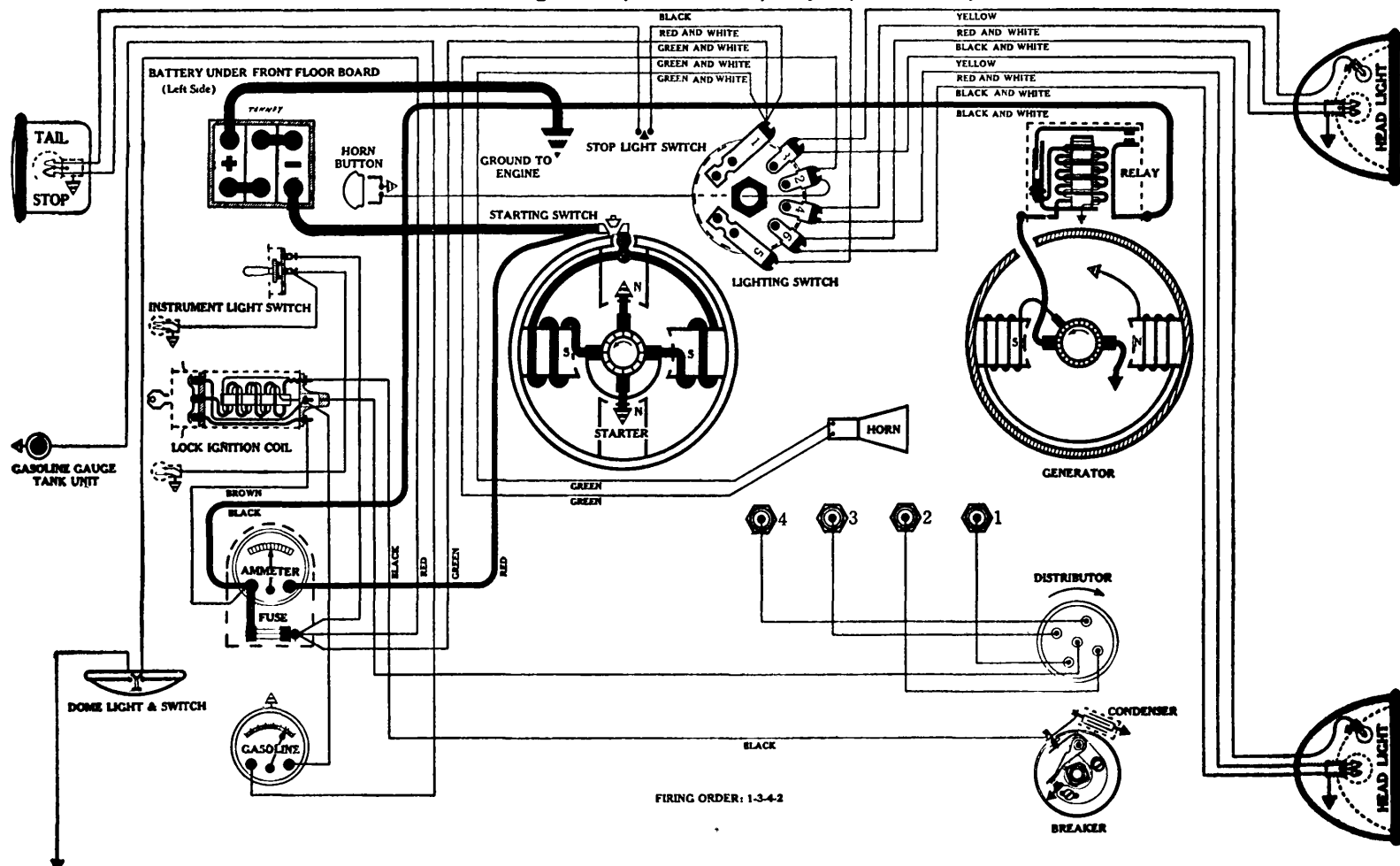
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20) mounted below ammeter, behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

PLYMOUTH

"Fl ating Power," Model PB, 4 cyl. (Late 1932)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—98 amps. for 20 minutes.

Lighting Capacity—4.9 amps. for 20 hours.

Box—Length, 9-1/16; width, 7-1/16; height, 8 3/8 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 714-Q

Connection to Engine—Mechanical gear shift incorporating over-running disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—160 to 180 amps. at 4.2 volts.

Lock Torque—12 pound feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 629-M

(Full Automatic Spark Advance in conjunction with Delco-Remy, 680-A Vacuum Retard)

Breaker—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz

Timing—Remove inspection cover plate, located on left front side of flywheel housing, directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when mark on flywheel is opposite "IGN. 10°" pointer on timing indicator plate. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, with adapter No. 114 and rod No. 40. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .046 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Special Metric (AC type K-12); Gap .022 inch.

Firing Order—1-3-4-2.

Vacuum Retard—20 degrees (on Flywheel).

Automatic Advance—14 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1300	4	650	2
1600	6	800	3
2100	10	1050	5
2400	12	1200	6
2600 (Max.)	14	1300	7

Lock Ignition Coil—Delco-Remy, 526-T.

NOTE—This unit is a combined ignition switch and coil. Impossible to "jump" out ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 943-S (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	800	6.5	12	1250	7.5
4	900	6.8	16	1600	8.1
8	1050	7.1	17	2800 (Max.)	8.8

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 4 1/2 volts.

Field Test—3 1/2 to 4 amps at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9271.

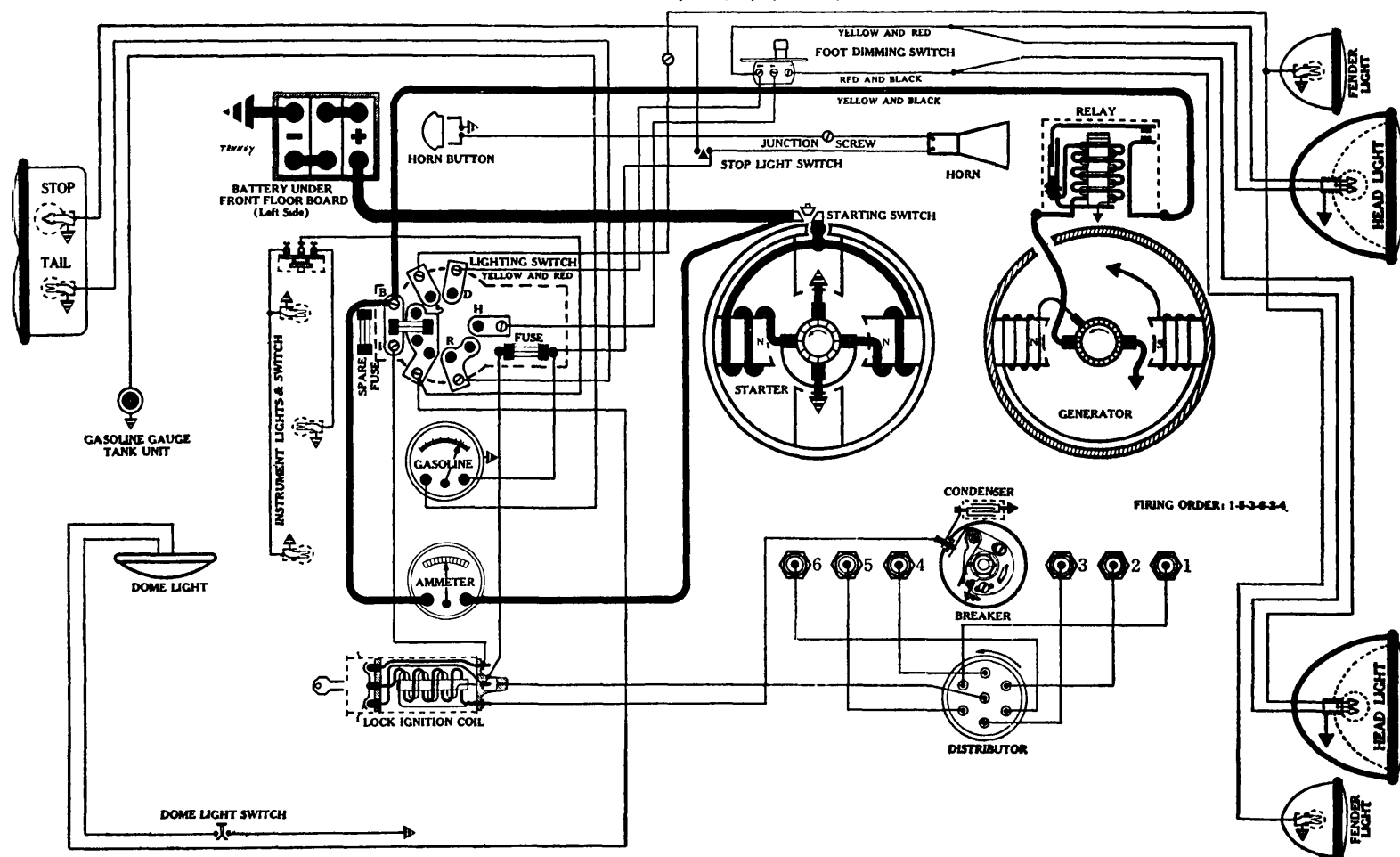
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20) mounted below ammeter, behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

PONTIAC

Model 402, 6 cyl., (1932)



BATTERY

Delco-Remy, 13-D, 6 volts. Negative Terminal Grounded

Starting Capacity—102 amps. for 20 minutes.

Lighting Capacity—4.9 amps. for 20 hours.

Box—Length, 9-1/16; width, 7; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 734-A

Connection to Engine—Delco-Remy Mechanical Shift.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—175 to 180 amps. at 4.5 volts.

Lock Torque—12 pound-feet, 475 amps., 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 827025.

IGNITION

Rotation, L. H., Top View

Delco-Remy, 639-U

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when first flywheel mark "IGN 1 & 6" is in line with pointer on flywheel housing. (Note: There are two 1 & 6 ignition marks on flywheel. The first mark is 8 degrees before T.D.C., and the second mark is 4 degrees before T.D.C. The recommended setting is on the FIRST MARK to compensate for wear). With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 114 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .018 inches before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Special Metric (AC type K-12); Gap .022 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—24 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
500	Start	250	Start
1200	6	600	3
2300	16	1150	8
3000	20	1500	10
3200 (Max.)	24	1600	12

Lock Ignition Coil—Delco-Remy, 534-W.

NOTE—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat," "Gauge," and "Timer." Coil must be connected as marked. Feed for gasoline gauge, stop light, and horn taken from "gauge" terminal of coil, thru fuse on lighting switch bracket.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 943-Y, (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	14	1400	7.9
5	800	7.1	16	1600	8.
9	1000	7.5	18	1700 (Max.)	8.2
12	1200	7.8			

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—17 to 19 amps. at 6 volts.

Field Test—3 1/2 amps. at 6 volts, across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Armature—Delco-Remy, 1843126.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9191.

Location—Behind instrument board. Operated by pull knob.

Fuses—(Lighting) 20 amp. fuse (type 3A-20) mounted on switch back (Stop and Horn) 20 amp. fuse (type 3A-20) mounted on switch support

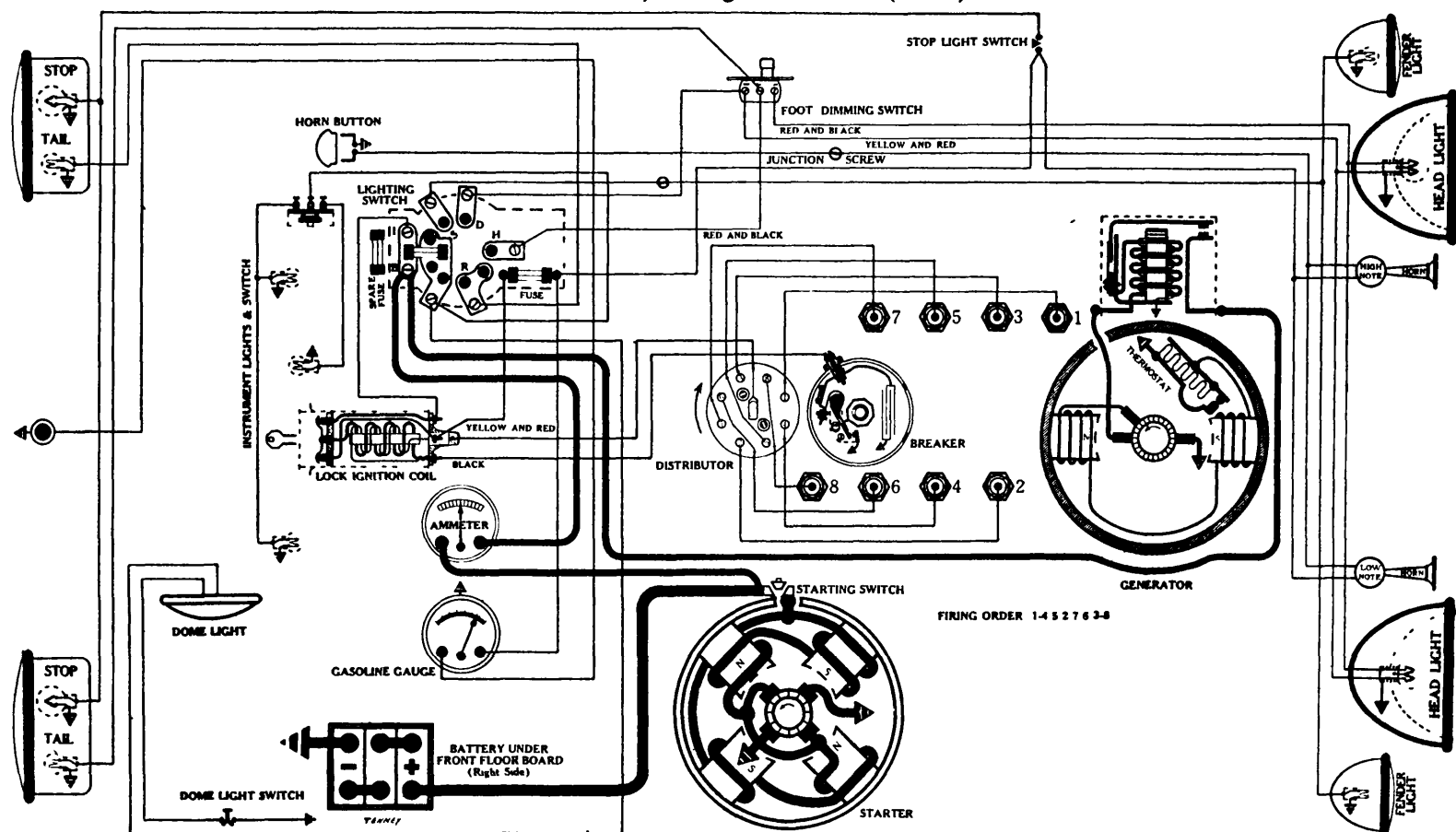
Foot Dimming Switch—Delco-Remy, 465-J or 465-Z

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; STOP—87; TAIL—63; DOME—63.

PONTIAC

Model 302, 90 degree "Vee" 8 (1932)



BATTERY

Delco-Remy, 15-D, 6 volts. Negative Terminal Grounded

Starting Capacity—137 amps. for 20 minutes.

Lighting Capacity—5.7 amps. for 20 hours.

Box—Length, 10-9/32; width, 7; height, 9 1/2 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 726-K

Connection to Engine—Delco-Remy Mechanical Shift.

Running Free—65 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—180 to 185 amps. at 4.5 volts.

Lock Torque—15 pound feet, 570 amps., 3.15 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 827025.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 661-C

(Full Automatic Spark Advance)

IMPORTANT NOTE!—The 661 series of Delco-Remy Distributors, designed for 1932 use, employ an EIGHT POINT CAM which operates but a SINGLE BREAKER ASSEMBLY. These distributors do not require synchronizing

Breaker—Contact separation .014 inch.

NOTE—Due to the peculiar design of the ignition cam, to insure good high speed performance, the contact separation must be accurately adjusted to .014 inch and NO MORE.

Contact Spring Tension—24 to 26 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when first flywheel mark "IGN 1 & 7" is in line with pointer on flywheel housing. (Note: There are two 1 & 7 ignition marks on flywheel. The first mark is 11 degrees before T.D.C., and the second mark is 7 degrees before T.D.C. The recommended setting is on the first mark to compensate for wear.) With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 8. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .082 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Special Metric (AC type K-12); Gap .022 inch.

Firing Order—1-4-5-2-7-6-3-8 (numbering from front to rear; odd numbers on left side).

Automatic Advance—27 degrees (on Flywheel):

Eng R P M	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1200	8	600	4
1800	16	900	8
2200	22	1100	11
2600 (Max.)	27	1300	13 1/2

Lock Ignition Coil—Delco-Remy, 534-W.

NOTE—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.", "Gauge," and "Timer." Coil must be connected as marked. Feed for gasoline gauge, stop light, and horn taken from "Gauge" terminal of coil, thru fuse on lighting switch bracket.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 959-Z (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps	R P.M.	Volts	Amps	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE—Thermostat opens about 165° F., reducing charging rate approx 80 to 40%

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 1/2 to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 1836929.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9191.

Location—Behind instrument board. Operated by pull knob.

Fuses—(Lighting) 20 amp. fuse (type 3A-20) mounted on switch back (Stop and Horn) 20 amp. fuse (type 3A-20) mounted on switch support.

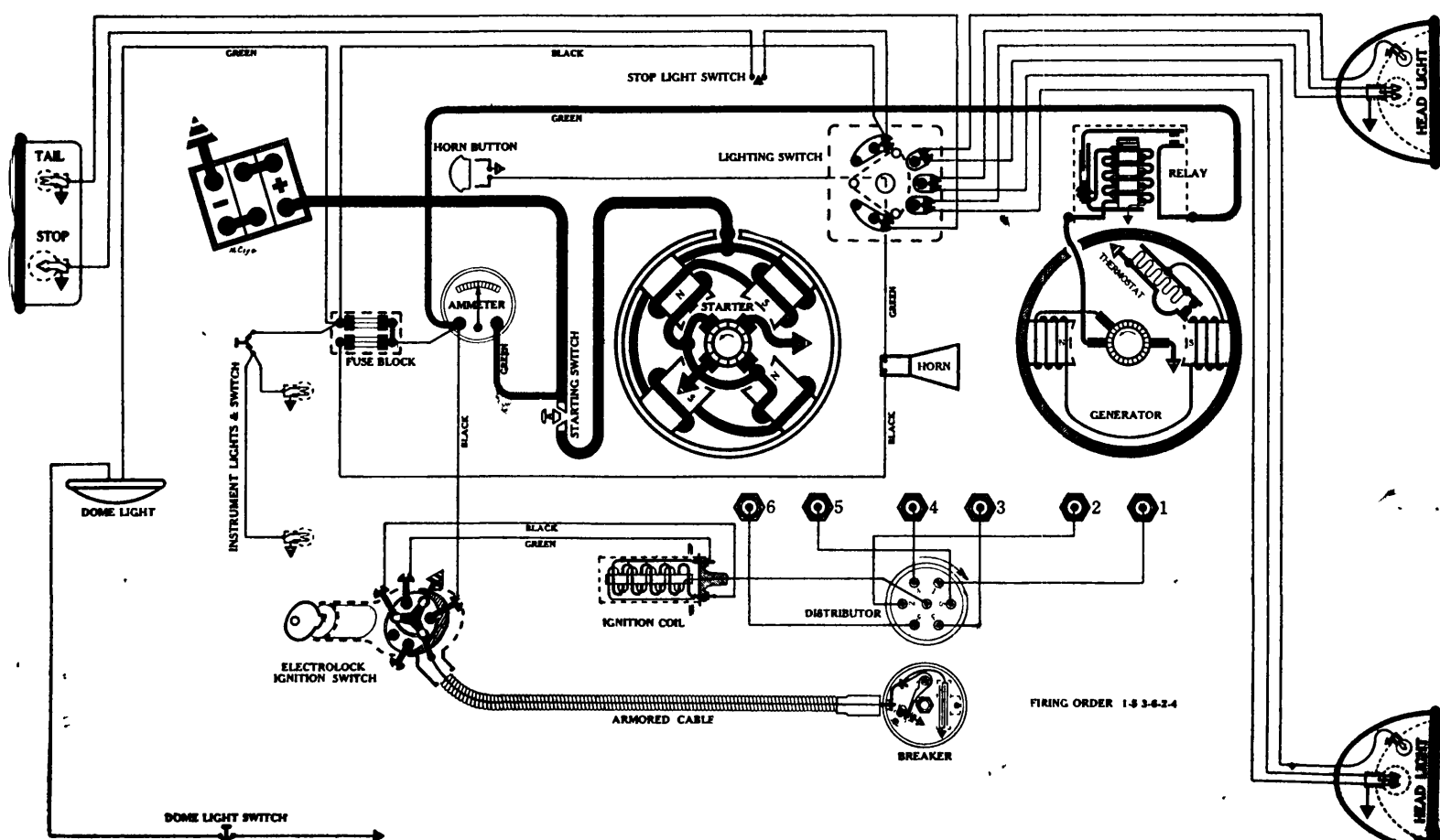
Foot Dimming Switch—Delco-Remy, 465-J or 465-Z.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; STOP—87; TAIL—63; DOME—63.

REO

Model S, 6 cyl. (1932)



BATTERY

Willard, WH-2-15, 6 volts. Negative Terminal Grounded
 Starting Capacity—140 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 24 hours.
 Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 718-H

Connection to Engine—Bendix Drive.
 Running Free—65 amps. at 5 volts, 6000 R.P.M.
 Cranking Engine—160 to 175 amps. at 4.3 volts.
 Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
 Brush Spring Tension—24 to 28 oz. on each.
 Armature—Delco-Remy, 818002.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 641-H

Breaker—Contact separation .022 inch.
 Contact Spring Tension—18 to 20 oz.
 Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .032 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
 Spark Plugs—Metric (Champion, type C-7); Gap .025 inch.
 Firing Order—1-5-3-6-2-4.
 Manual Advance—25 degrees (on Flywheel).
 Automatic Advance—19 degrees (on Flywheel).
 Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance (on flywheel) (on cam)

900	0	450	0
1200	4	600	2
1600	9	800	4½
2000	14	1000	7
2400 (Max.)	19	1200	9½

Ignition Coil—Delco-Remy, 528-E.

Ignition Switch—"Electrolock," type 15-S. NOTE:—This is a new type, three position ignition switch, designed for use on "Startix" equipped cars. While this car is not "Startix" equipped, this automatic device may easily be attached.

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 955-R

Performance Data—Gen. cold Thermostat closed.					
Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE—Thermostat opens about 165° F., reducing charging rate approx 30 to 40%.
 Motoring Freely—5 to 5½ amps. at 6 volts.
 Max. Stall Current—18 to 20 amps. at 6 volts.
 Field Test—4¼ to 5½ amps. at 6 volts across field coils in series.
 Brush Spring Tension—16 to 18 oz. on each.
 Armature—Delco-Remy, 817807.
 Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

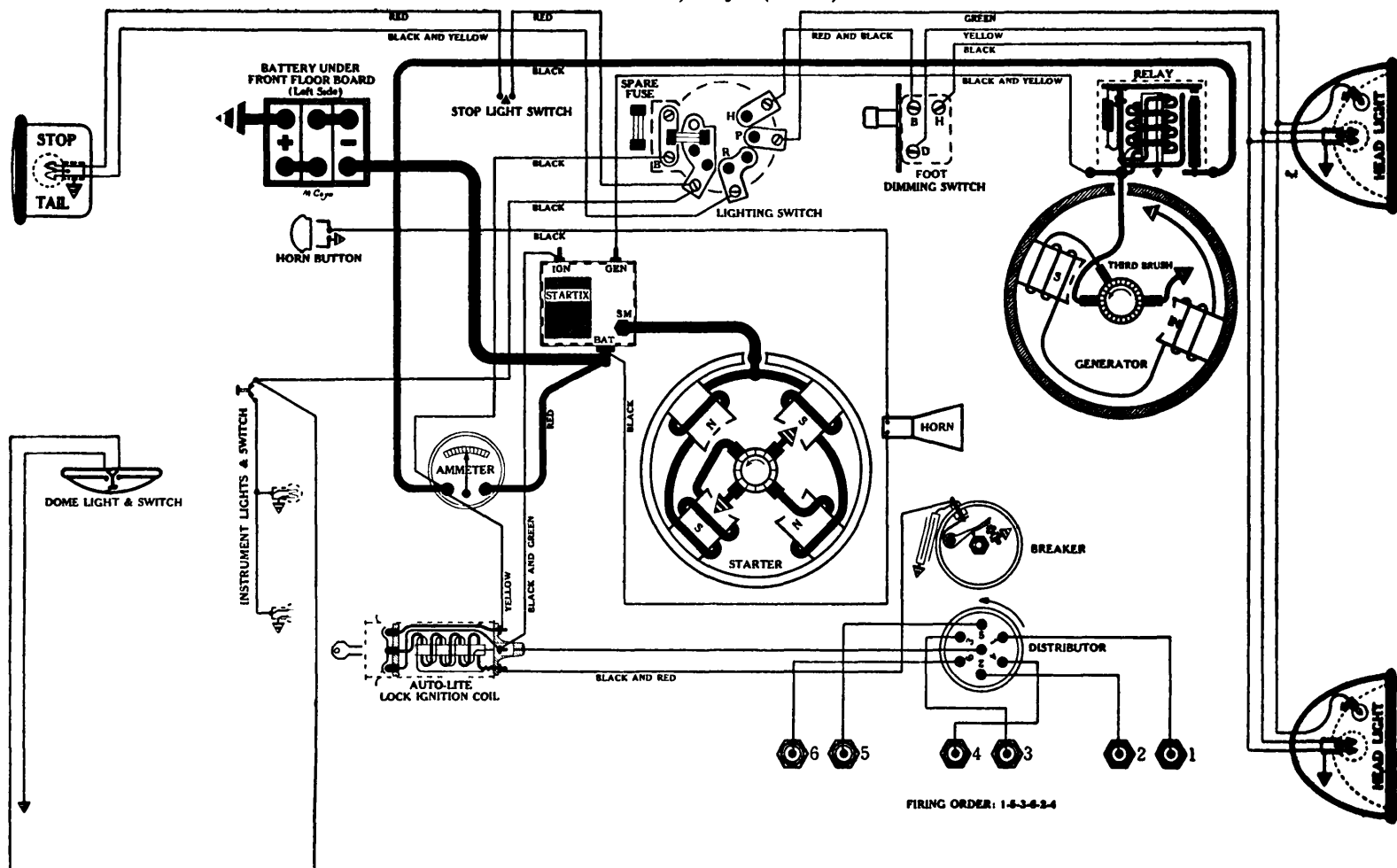
Closes—7 to 7½ volts.
 Opens—0 to 2½ amps. discharge.
 Contact Gap—.015 to .025 inch.
 Core Gap—.014 to .018 inch. contacts closed.

LIGHTING

Switch—Delco-Remy, 486-X.
 Location—Foot of steering column. Lights controlled by lever on steering wheel.
 Fuses—Two 20 amp. fuses (type 3A-20), mounted on block located behind and above instruments (about center of instrument board).
 Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); AUX.—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

ROCKNE

Model 65, 6 cyl. (1932)



BATTERY

Willard, WH-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Lighting Capacity—4.9 amps. for 20 hours.

Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite, MAJ-4026

Connection to Engine—Bendix Drive.

Running Free—67 amps. at 5.5 volts, 5000 R.P.M.

Cranking Engine—170 amps. at 5.1 volts, 225 R.P.M.

Lock Torque—12½ pound-feet, 575 amps., 3 volts.

Brush Spring Tension—36 to 40 oz. on each.

Starting Switch—"Startix," type D, Automatic Starting Switch and Anti-Stall Device, manufactured by the Eclipse Machine Corp., Elmira, N. Y. For complete details of operation and instructions on servicing see Sec. AA.

Armature—Auto-Lite, MAJ-2046.

IGNITION

Rotation, L. H., Top View

Auto-Lite, IGB-4070

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Contact Spring Tension—17 to 19 oz.

Timing—With No. 1 piston on compression stroke, bring flywheel punch marks (found ½ inch before the "U.D.C. 1-6" flywheel mark) opposite pointer. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .009 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—¾ inch Regular (Champion No. 2); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—23 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1000	4	500	2
1440	8	720	4
1850	12	925	6
2270	16	1135	8
2700	20	1350	10
3000 (Max.)	23	1500	11½

Lock Ignition Coil—Auto-Lite, IG-4306.

NOTE—This is a new, three key position, Auto-Lite coil, designed for use on "Startix" equipped cars. There are three "primary" terminals located around the bakelite top, which terminals are marked "DIS.," "STA.," and "BAT." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAM-4401 (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.4	10	1180	7.2
2	780	6.6	12	1320	7.4
4	870	6.7	14	1520	7.6
6	960	6.9	16	1860	7.8
8	1060	7.1	17	2400 (Max.)	8.

Motoring Freely—5 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4½ amps. at 6 volts.

Brush Spring Tension—20 to 24 oz. on main; 30 to 34 oz. on third.

Armature—Auto-Lite, GAM-2055.

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4022

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9236.

Location—Behind instrument board. Operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch back.

Spare fuse in clip on switch support.

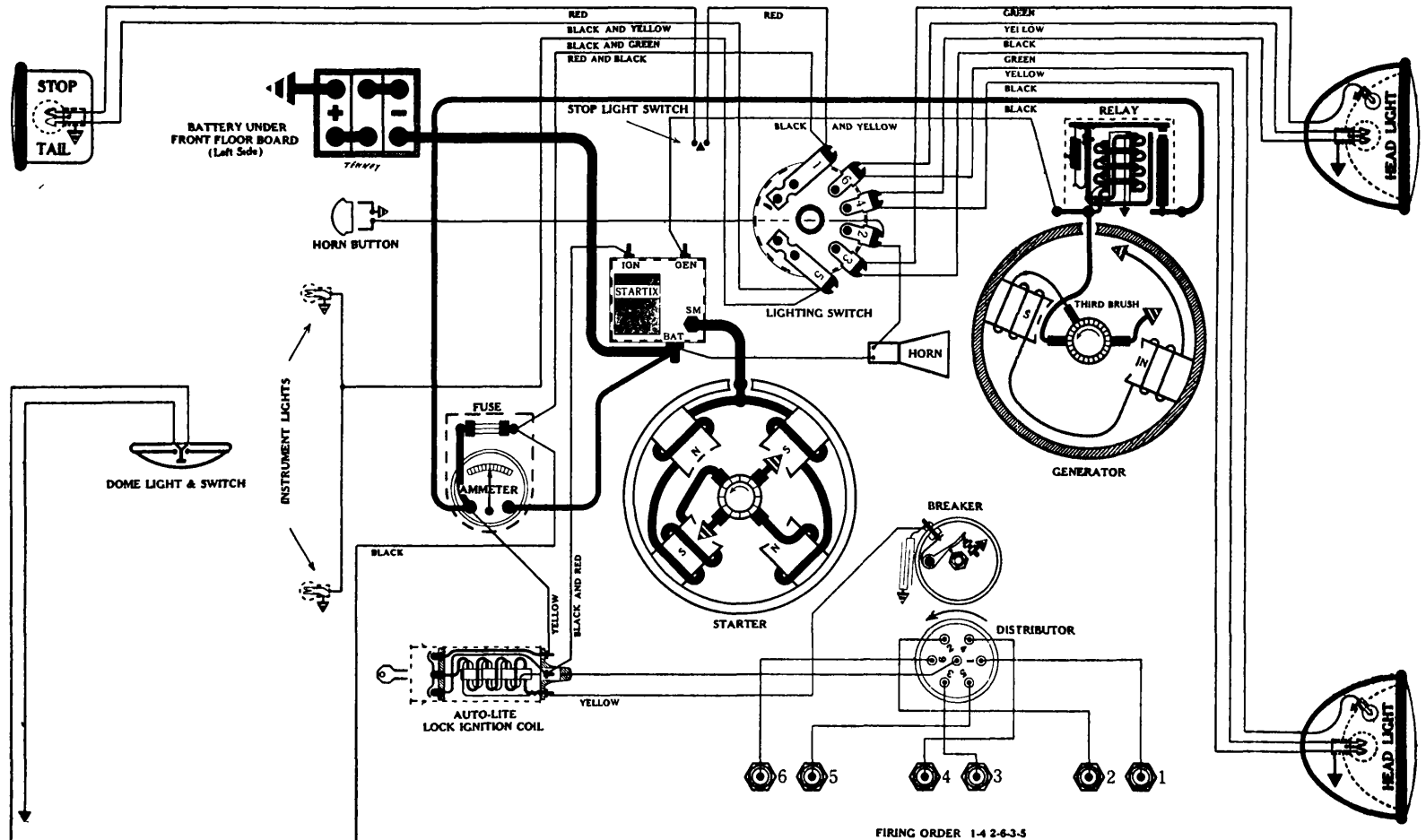
Foot Dimming Switch—Clum 9126.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); AUX.—81; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

ROCKNE

Model 75, 6 cyl., (1932)



BATTERY

Willard, WH-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Lighting Capacity—4.9 amps. for 20 hours.

Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite, MAN-4001

Connection to Engine—Bendix Drive.

Running Free—60 amps. at 5.5 volts, 3750 R.P.M.

Cranking Engine—160 to 175 amps. at 5.25 volts.

Lock Torque—14½ pound-feet, 575 amps., 3.1 volts.

Brush Spring Tension—40 to 48 oz. on each.

Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device, manufactured by the Eclipse Machine Corp., Elmira, N. Y. For complete details of operation and instructions on servicing see Sec. AA.

Armature—Auto-Lite, MAD-2054.

IGNITION

Rotation, L. H., Top View

Auto-Lite, IGB-4062

Breaker—Contact separation .020 inch.

Contact Spring Tension—17 to 19 oz.

Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke bring flywheel punch marks (found 35/64 inches before the "U.D.C. 1-6" flywheel mark) opposite pointer. With spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .012 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—¾ inch Regular (Champion No. 2); Gap .025 inch.

Firing Order—1-4-2-6-3-5.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—23 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1020	4	510	2
1440	8	720	4
1860	12	930	6
2280	16	1140	8
2700	20	1350	10
2900	22	1450	11
3000 (Max.)	23	1500	11½

Lock Ignition Coil—Auto-Lite, IG-4304.

NOTE—This is a new, three key position, Auto-Lite, coil, designed for use on "Startix" equipped cars. There are three "primary" terminals located around the bakelite top, which terminals are marked "DIS.," "STA.," and "BAT." Coil must be connected as marked.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAM-4401, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.4	10	1180	7.2
2	780	6.6	12	1320	7.4
4	870	6.7	14	1520	7.6
6	960	6.9	16	1860	7.8
8	1060	7.1	17	2400 (Max.)	8.

Motoring Freely—5 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4½ amps. at 6 volts.

Brush Spring Tension—20 to 24 oz. on main; 30 to 34 oz. on third.

Armature—Auto-Lite, GAM-2055.

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4022

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9115.

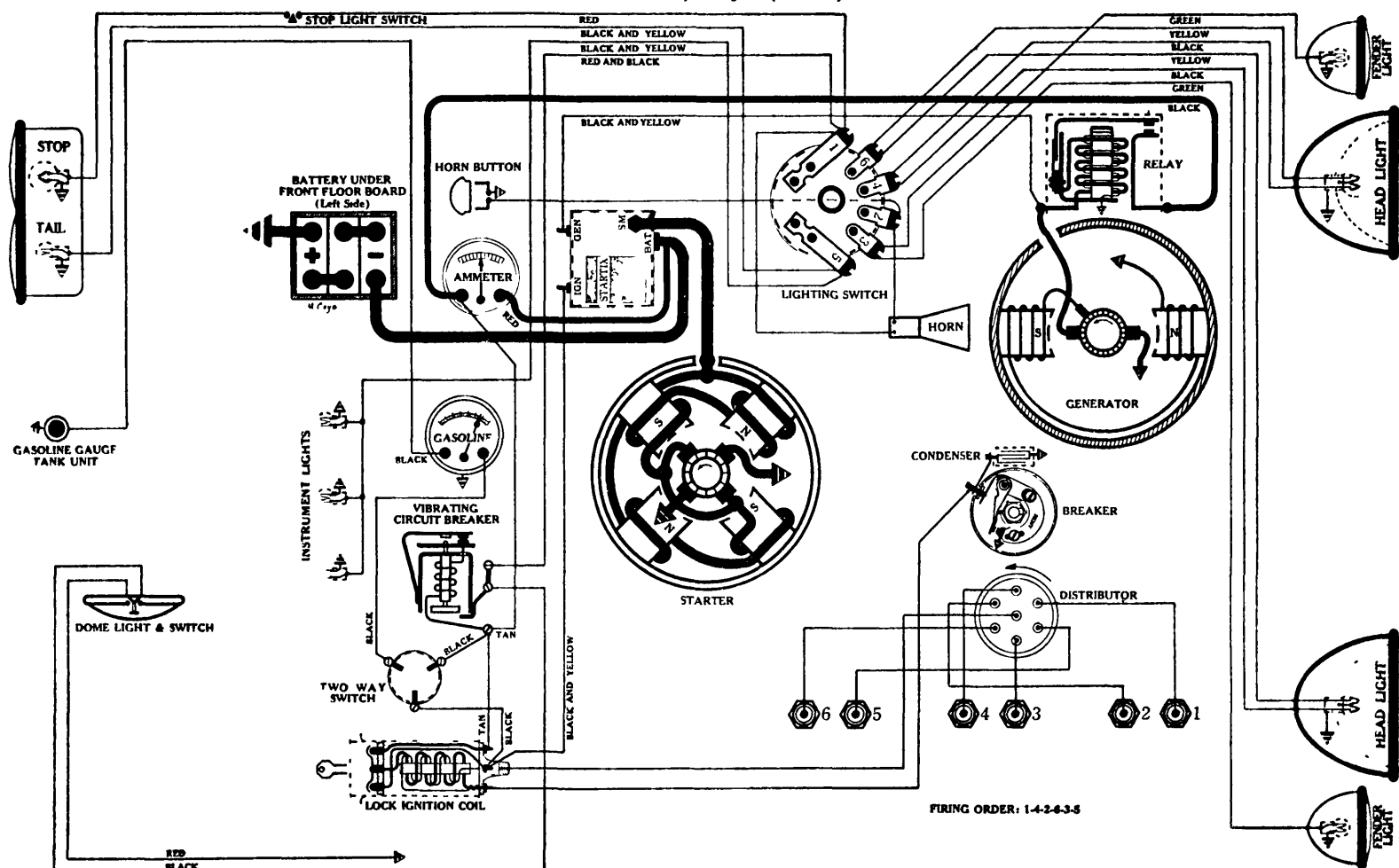
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20), mounted above ammeter, behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); AUX.—81; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

STUDEBAKER

Model 55, 6 cyl. (1932)



BATTERY

Willard, WH-1-13, 6 volts.- Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Lighting Capacity—4.9 amps. for 20 hours.

Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 718-Z

Connection to Engine—Bendix Drive.

Running Free—65 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—160 to 175 amps. at 4.3 volts.

Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—"Startix," type D, Automatic Starting Switch and Anti-Stall Device, manufactured by the Eclipse Machine Corp., Elmira, N. Y. For complete details of operation and instructions on servicing see Sec. AA.

Armature—Delco-Remy, 820626.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 632-M

(Semi-automatic spark advance in conjunction with
Delco-Remy 680-D Vacuum Retard)

Breaker—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz.

Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke bring flywheel punch marks (found 1/2 inch before "U.D.C. 1-6" flywheel mark) opposite pointer, spark fully advanced, rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .009 inch before T.D.C., as indicated on Gauge. With spark in full advance position rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—3/8 inch (Champion No. 2); Gap .025 inch.

Firing Order—1-4-2-6-3-5.

Manual Advance—15 degrees (on Flywheel).

Vacuum Retard—6 degrees (on Flywheel)

Automatic Advance—23 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1200	4	600	2
2100	14	1050	7
2700	20	1350	10
3000	23	1500	11 1/2

Lock Ignition Coil—Delco-Remy, 534-X or 536-Z.

NOTE—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat," "Gauge," and "Timer." Coil must be connected as marked. Feed for gasoline gauge and "Ign" terminal on "Startix" unit taken from "Gauge" terminal of coil.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 943-V (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	15	1400	8.
5	1000	7.2	17	1850 (Max.)	8.2
11	1200	7.9			

Motoring Freely—4 to 5 amps. at 6 volts.

Max. Stall Current—19 to 20 amps. at 6 volts.

Field Test—3 1/2 to 4 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 817221.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9115.

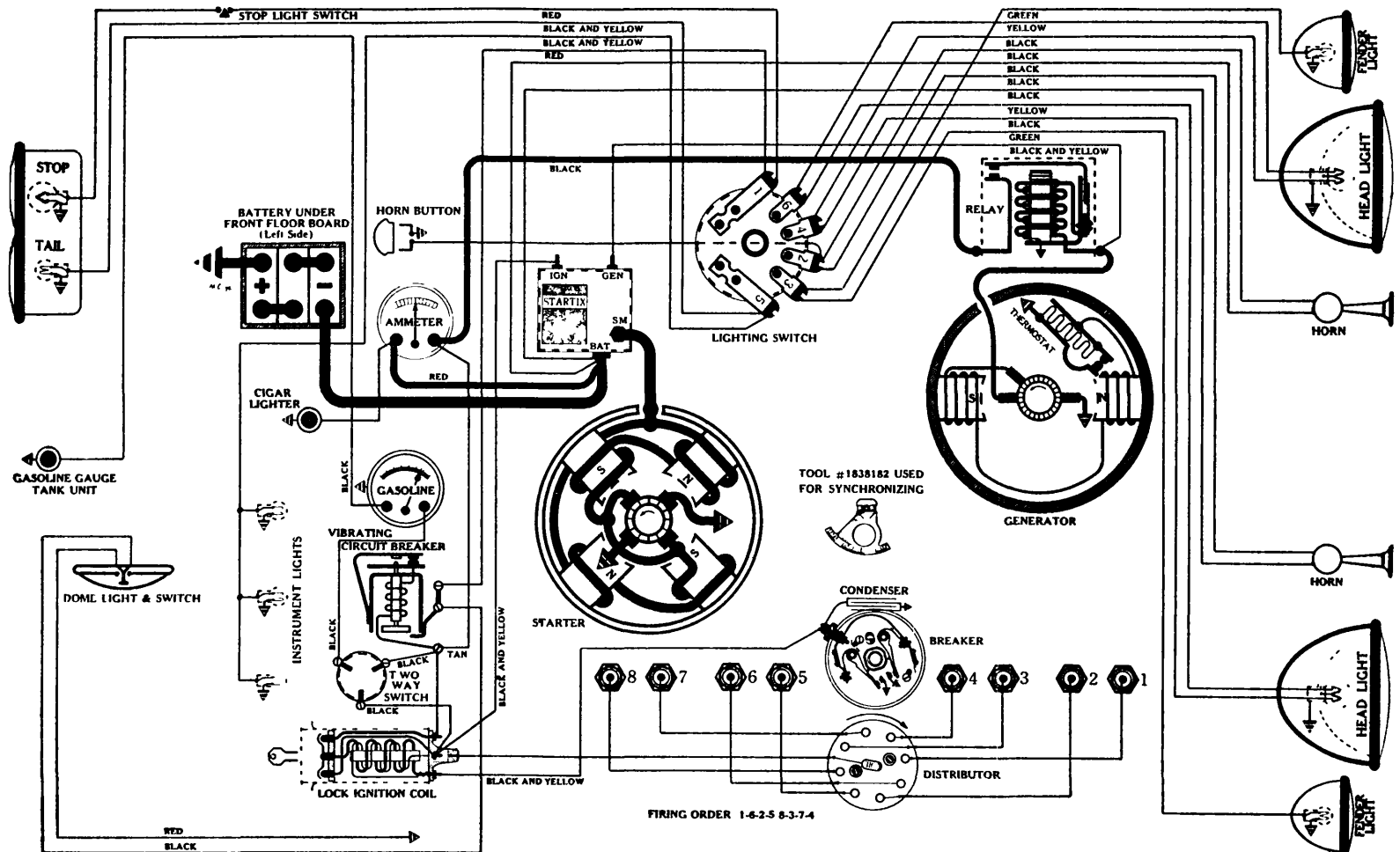
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-L. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

STUDEBAKER

Model 62, Dictator Straight Eight, (1932)



BATTERY

Willard, WH-1-13, 6 volts. Positive Terminal Grounded
Starting Capacity—120 amps. for 20 minutes.
Lighting Capacity—4.9 amps. for 20 hours.
Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 718-Y

Connection to Engine—Bendix Drive.
Running Free—65 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—160 to 175 amps. at 4.3 volts.
Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device, manufactured by the Eclipse Machine Corp., Elmira, N. Y. For complete details of operation and instructions on servicing see Sec. AA.
Armature—Delco-Remy 1838663.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 660-M

(Semi-automatic spark advance in conjunction with Delco-Remy 680-C Vacuum Retard)

Breakers—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing—IMPORTANT! Before timing ignition insert a 1/8 inch dia. pin through hole in the distributor manual control arm and slot in secondary arm which is connected to vacuum unit. Time ignition in full advance position. With No. 1 piston on compression stroke bring flywheel punch marks (found 3/4 inch before "U.D.C. 1-8" flywheel mark) directly under pointer in flywheel housing. With spark fully advanced, rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .023 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—3/8 inch regular (Champion, No. 2); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—25 degrees (on Flywheel).
Vacuum Retard—6 degrees (on Flywheel).
Automatic Advance—29 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	2	300	1
1200	6	600	3
1900	12	950	6
2500	18	1250	9
3200	24	1600	12
3600 (Max.)	29	1800	14 1/2

Lock Ignition Coil—Delco-Remy, 534-X or 536-Z.

NOTE—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked. Feed for gasoline gauge and "Ign" terminal on "Startix" unit taken from "Gauge" terminal of coil.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-C, (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 820370.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9115.

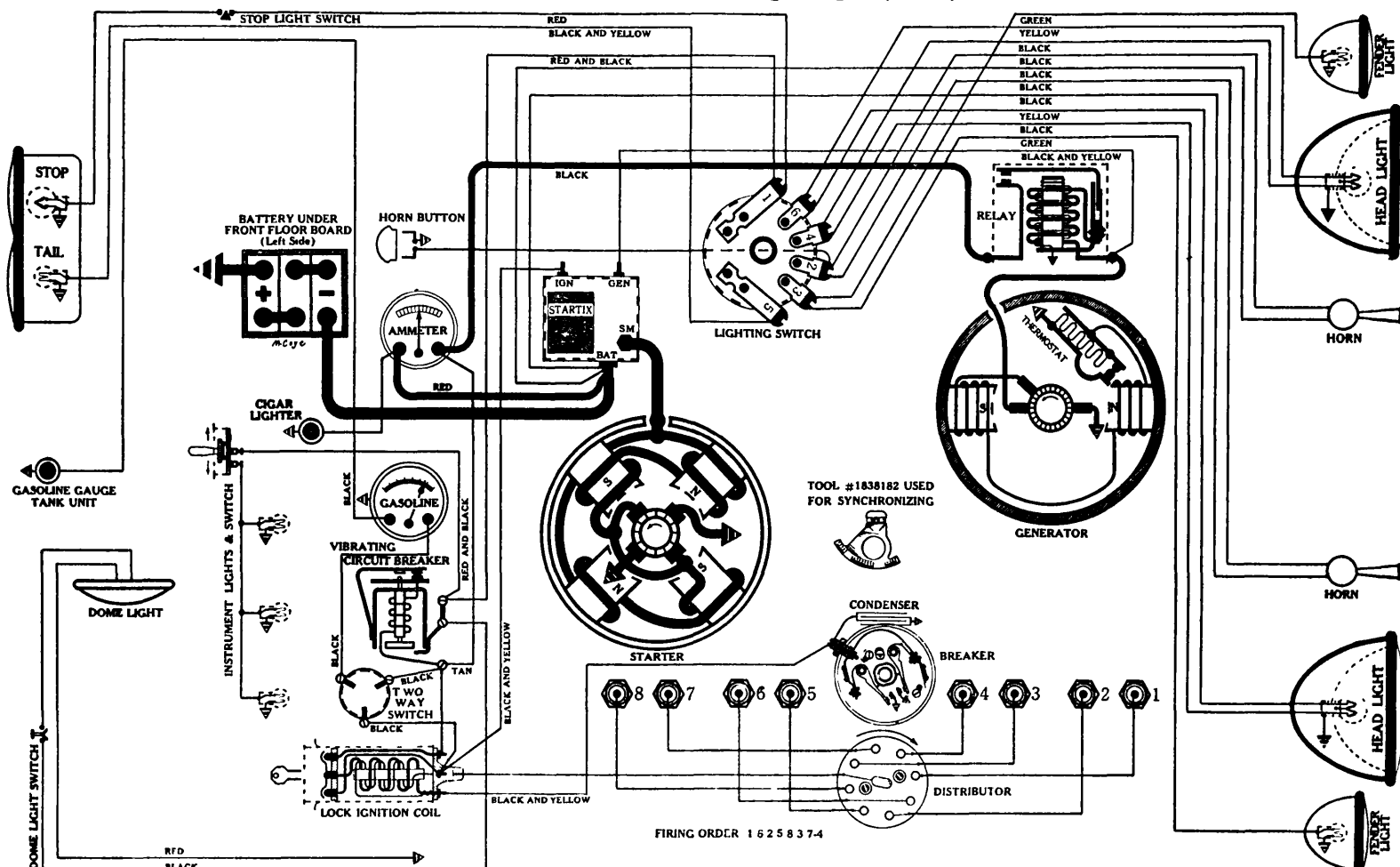
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-L. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

STUDEBAKER

Mod 171, Commander Straight Eight (1932)



BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded
Starting Capacity—160 amps. for 20 minutes.
Lighting Capacity—6.6 amps. for 20 hours.
Box—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 718-Y

Connection to Engine—Bendix Drive.
Running Free—65 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—160 to 175 amps. at 4.3 volts.
Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—"Startix," type D, Automatic Starting Switch and Anti-Stall Device, manufactured by the Eclipse Machine Corp., Elmira, N. Y. For complete details of operation and instructions on servicing see Sec. AA.
Armature—Delco-Remy, 1838663.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 660-M

(Semi-automatic spark advance in conjunction with Delco-Remy 680-C Vacuum Retard)

Breakers—Contact separation .020 inch.
Contact Spring Tension—18 to 20 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary
Timing—IMPORTANT! Before timing ignition insert a 3/8 inch dia. pin through hole in the distributor manual control arm and slot in secondary arm which is connected to vacuum unit. Time ignition in full advance position. With No. 1 piston on compression stroke bring flywheel punch marks (found 3/4 inch before "U.D.C. 1-8" flywheel mark) directly under pointer in flywheel housing. With spark fully advanced, rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .023 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—3/8 inch regular (Champion No. 2); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—25 degrees (on Flywheel).
Vacuum Retard—6 degrees (on Flywheel).

Automatic Advance—29 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	2	300	1
1200	6	600	3
1900	12	950	6
2500	18	1250	9
3200	24	1600	12
3600 (Max.)	29	1800	14 1/2

Lock Ignition Coil—Delco-Remy, 534-X or 536-Z.

NOTE—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat," "Gauge," and "Timer." Coil must be connected as marked. Feed for gasoline gauge and "Ign." terminal on "Startix" unit taken from "Gauge" terminal of coil

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-C (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE—Thermostat opens about 165° F., reducing charging rate approx. 80 to 40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4% to 5 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 820370.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9115.

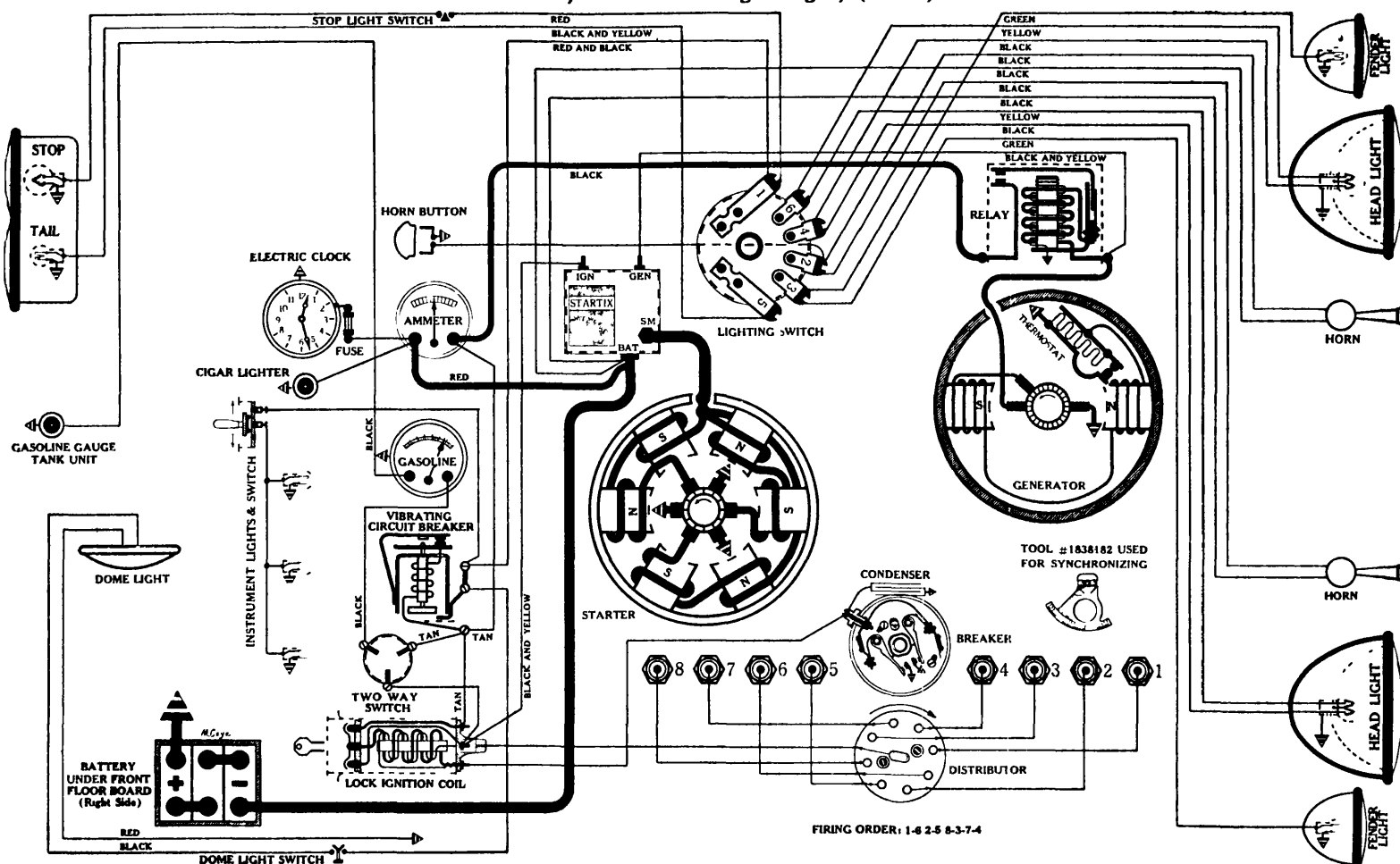
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-L. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

STUDEBAKER

Model 91, President Straight Eight, (1932)



BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded
Starting Capacity—160 amps. for 20 minutes.
Lighting Capacity—6.6 amps. for 20 hours.
Box—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 497

Connection to Engine—Bendix Drive.
Running Free—70 amps. at 5 volts, 3000 R.P.M.
Cranking Engine—230 to 245 amps. at 4.1 volts.
Lock Torque—19 pound-feet, 500 amps. at 3 volts.
Brush Spring Tension—36 to 40 oz. on each.
Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device, manufactured by the Eclipse Machine Corp., Elmira, N. Y. For complete details of operation and instructions on servicing see Sec. AA.
Armature—Delco-Remy, 1843420.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 662-A

(Semi-automatic spark advance in conjunction with Delco-Remy 680-C Vacuum Retard)

Breakers—Contact separation .020 inch
Contact Spring Tension—18 to 20 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary
Timing—IMPORTANT! Before timing ignition insert a 1/8 inch dia. pin through hole in the distributor manual control arm and slot in secondary arm which is connected to vacuum unit. Time ignition in full advance position. With No. 1 piston on compression stroke bring flywheel punch marks (found 1 inch before "U.D.C. 1-8" flywheel marks) directly under pointer on right side of flywheel housing. With spark fully advanced, rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .021 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—3/8 inch (Champion No. 2); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—25 degrees (on Flywheel).
Vacuum Retard—6 degrees (on Flywheel).

Automatic Advance—23 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	2	300	1
1200	4	600	2
1800	8	900	4
2400	12	1200	6
3000	16	1500	8
3800	23	1900	11 1/2

Lock Ignition Coil—Delco-Remy, 534-X or 536-Z.

NOTE—This unit is a combined ignition switch and coil. Impossible to "jump out" ignition switch with wire to run engine. Coil has three "primary" terminals marked "Bat.," "Gauge," and "Timer." Coil must be connected as marked. Feed for gasoline gauge and "Ign." terminal on "Startix" unit taken from "Gauge" terminal of coil.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-J, (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.					
Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	14	1400	7.9
5	800	7.1	16	1600	8.
9	1000	7.5	18-20	1700 (Max.)	8.2
12	1200	7.8			

Motoring Freely—3 to 3 1/2 amps. at 6 volts.

Max. Stall Current—19 to 21 amps. at 6 volts.

Field Test—2 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1839078.

Third Brush Adjustment—Loosen cover band See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9115.

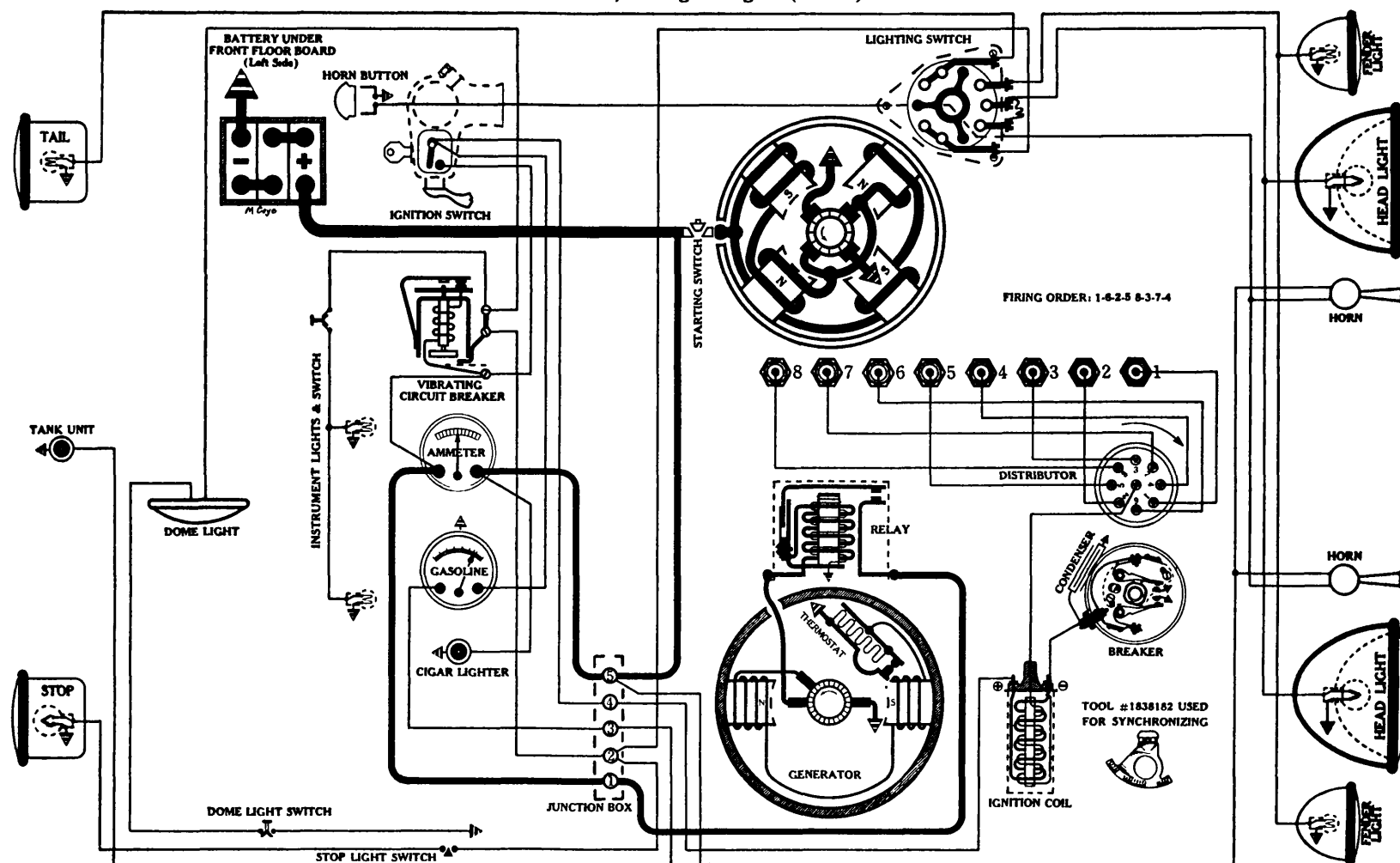
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-L. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

STUTZ

Model DV-32, Straight Eight (1932)



BATTERY

Prest-O-Lite, A-6-17-SP, 6 volts. Negative Terminal Grounded

Starting Capacity—170 amps. for 20 minutes.

Lighting Capacity—6.6 amps. for 20 hours.

Box—Length, 13; width, 7; height, 9 1/2 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 726-C

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—65 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—160 to 175 amps. at 4.3 volts.

Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 16210.

Armature—Delco-Remy, 820347.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 660-W

Breakers—Contact separation .020 inch.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 8. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .136 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (Champion No. 8); Gap .022 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—38 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	Start	200	Start
800	4	400	2
1200	8	600	4
2000	16	1000	8
2600 (Max)	22	1300	11

Ignition Coil—Delco-Remy, 528-C.

Ignition Switch—Hershey-Oakes Steering Ignition Lock—Combination Ignition Switch and Steering Post Lock.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 391

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7	20	1450 (Max.)	8.3
6	800	7.1	19	1700	8.3
11	1000	7.9			

NOTE—Thermostat opens about 165° F., reducing charging rate approx 30 to 40%

Motoring Freely—3 1/2 to 4 amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—2.3 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, No. 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-G.

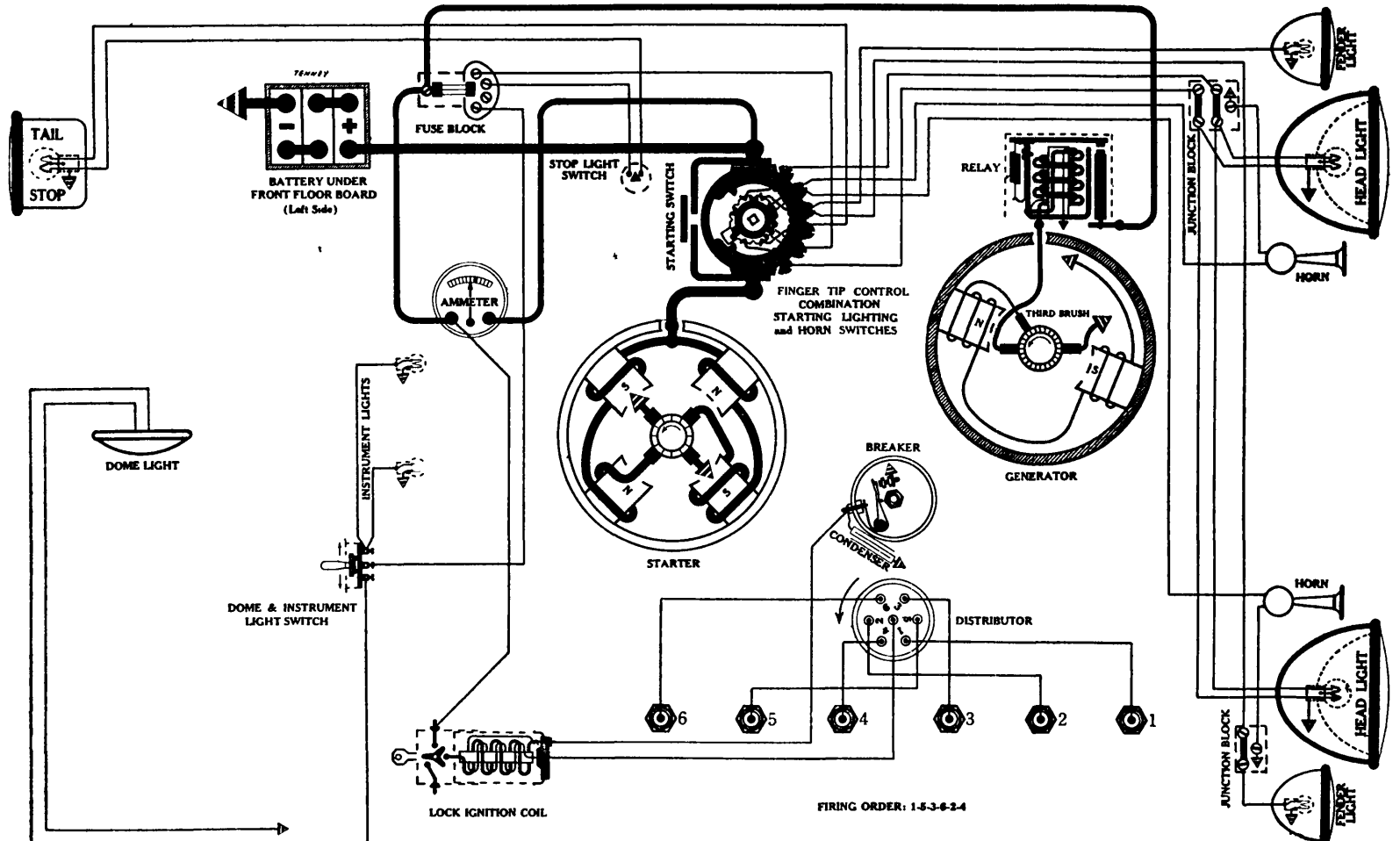
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-C. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See Lamp Table, Sec. AA. HEAD—1129; FENDER—63; INSTRUMENT—63; DOME—64; TAIL—63; STOP—87.

WILLYS

Model 6-90, 6 cyl., (1932)



BATTERY

U. S. L., XY-13-A, 6 volts. Negative Terminal Grounded

Starting Capacity—102 amps. for 20 minutes.

Lighting Capacity—4.3 amps. for 20 hours.

Box—Length, 9; width, 7½; height, 8⅝ inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MZ-4024

Connection to Engine—Bendix Drive.

Running Free—47 amps. at 5½ volts, 4902 R.P.M.

Cranking Engine—175 to 185 amps. at 4½ volts.

Lock Torque—10 pound-feet, 470 amps. at 3½ volts.

Brush Spring Tension—44 to 48 oz. on each.

Starting Switch—Located foot of steering column. Operated by pulling up on horn button.

Armature—Auto-Lite, MZ-2082.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGB-4032

Breakers—Contact separation .020 inch.

Contact Spring Tension—17 to 19 oz.

Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke slowly hand crank engine until flywheel mark "IGN" lines up with pointed end of inspection plate screw. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (Champion, type C-7); Gap .022 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on fly wheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	- Start	200	- Start
800	- 3	400	1.5
1200	- 6	600	3
2000	- 12	1000	6
2400	- 16	1200	8
3200 (Max.)	- 22	1600	11

Lock Ignition Coil—Auto-Lite, IG-4501.

NOTE—This is a new type coil, with but one primary terminal at top, which should always be connected to the breaker. Two other primary terminals are located at base of coil, either one of which may be used for the "hot" feed, the other terminal is for the gas gauge or other auxiliary units.

GENERATOR
Rotation, L. H., Com. End
Auto-Lite, GAL-4331

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.3	13	1200	7.5
6	800	6.9	15	1400	7.7
10	1000	7.1	17	1900 (Max.)	8.

Motoring Freely—4½ to 5 amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Field Fuse—(None).

Brush Spring Tension—10 to 13 oz. on each.

Armature—Auto-Lite, GAL-2143

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY
Auto-Lite, CB-4014

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Pines Finger Tip Control, No. A-803.

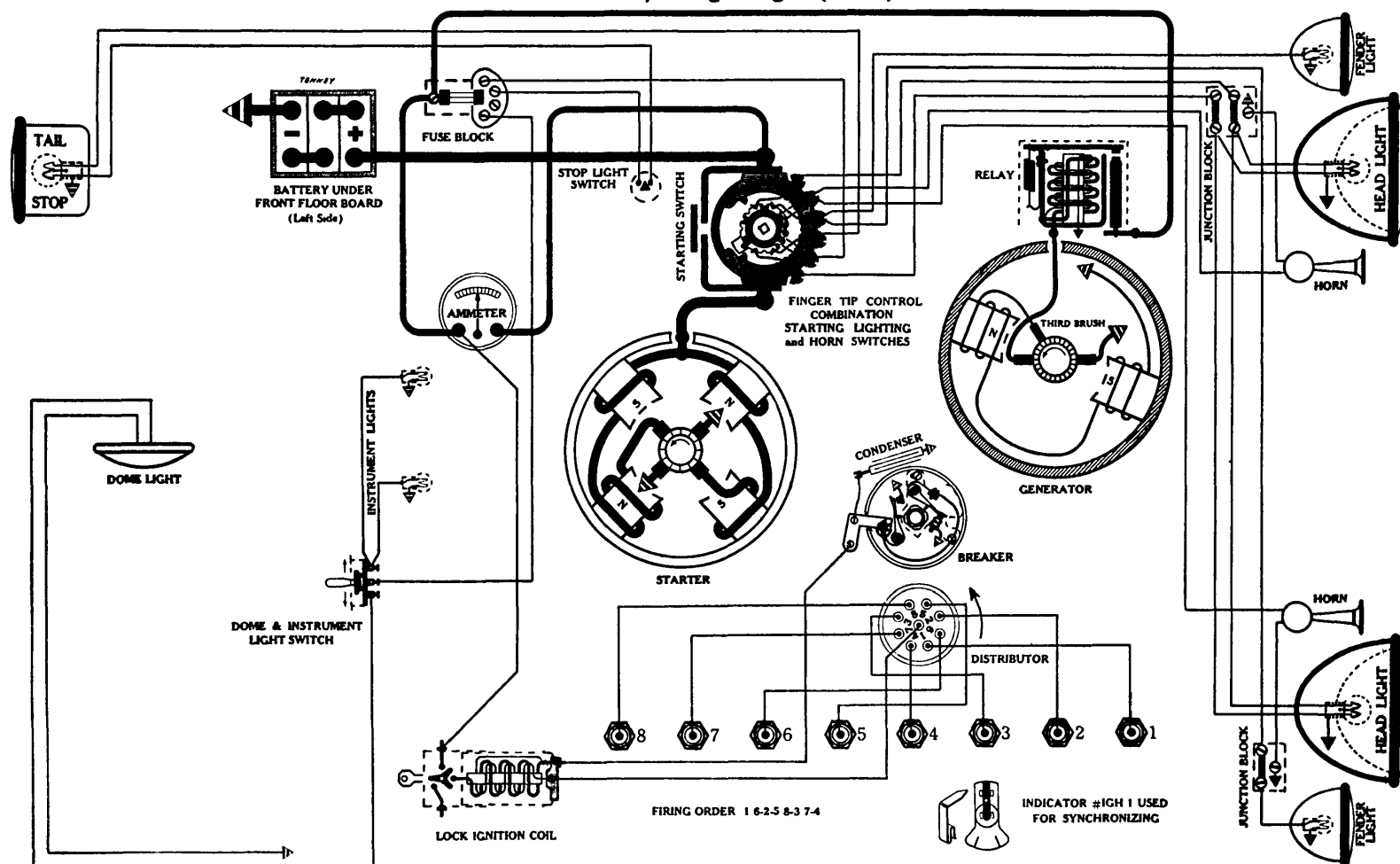
Location—Foot of steering column This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on block under engine hood (left side).

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER OR AUX.—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

WILLYS

Model 8-88, Straight Eight (1932)



BATTERY

U.S.L., HW-15-A, 6 volts. Negative Terminal Grounded

Starting Capacity—148½ amps. for 20 minutes.

Lighting Capacity—71 amps. for 20 hours.

Box—Length, 11½; width, 7½; height, 9½ inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4035

Connection to Engine—Bendix Drive.

Running Free—46 amps. at 5.5 volts, 4020 R.P.M.

Cranking Engine—160 to 170 amps. at 4.2 volts.

Lock Torque—17 pound-feet, 520 amps. at 3 volts.

Brush Spring Tension—44 to 48 oz. on each

Starting Switch—Located foot of steering column. Operated by pulling up on horn button.

Armature—Auto-Lite, MAB-2098.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGH-4013

Breakers—Contact separation .018 inch.

Contact Spring Tension—17 to 19 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—IMPORTANT! Time ignition in full advance position. With No 1 piston on compression stroke slowly turn engine until flywheel mark "IGN" (found 6 degrees before T.D.C.) lines up with pointed end of inspection plate screw. With rotor opposite No 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 40. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .014 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor opposite No 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—Metric (Champion type C-7); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel).

Eng R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	Start	200	Start
1200	6	600	3
2000	13	1000	6½
3000	19	1500	9½
3400 (Max.)	22	1700	11

Lock Ignition Coil—Auto-Lite, IG-4501.

NOTE—This is a new type coil, with but one primary terminal at top, which should always be connected to the breaker. Two other primary terminals are located at base of coil, either one of which may be used for the "hot" feed, the other terminal is for the gas gauge or other auxiliary units.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4331

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.3	13	1200	7.5
6	800	6.9	15	1400	7.7
10	1000	7.1	17	1900 (Max.)	8.

Motoring Freely—4½ to 5 amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Field Fuse—(None).

Brush Spring Tension—10 to 13 oz. on each.

Armature—Auto-Lite, GAL-2143.

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Pines Finger Tip Control, No A-803.

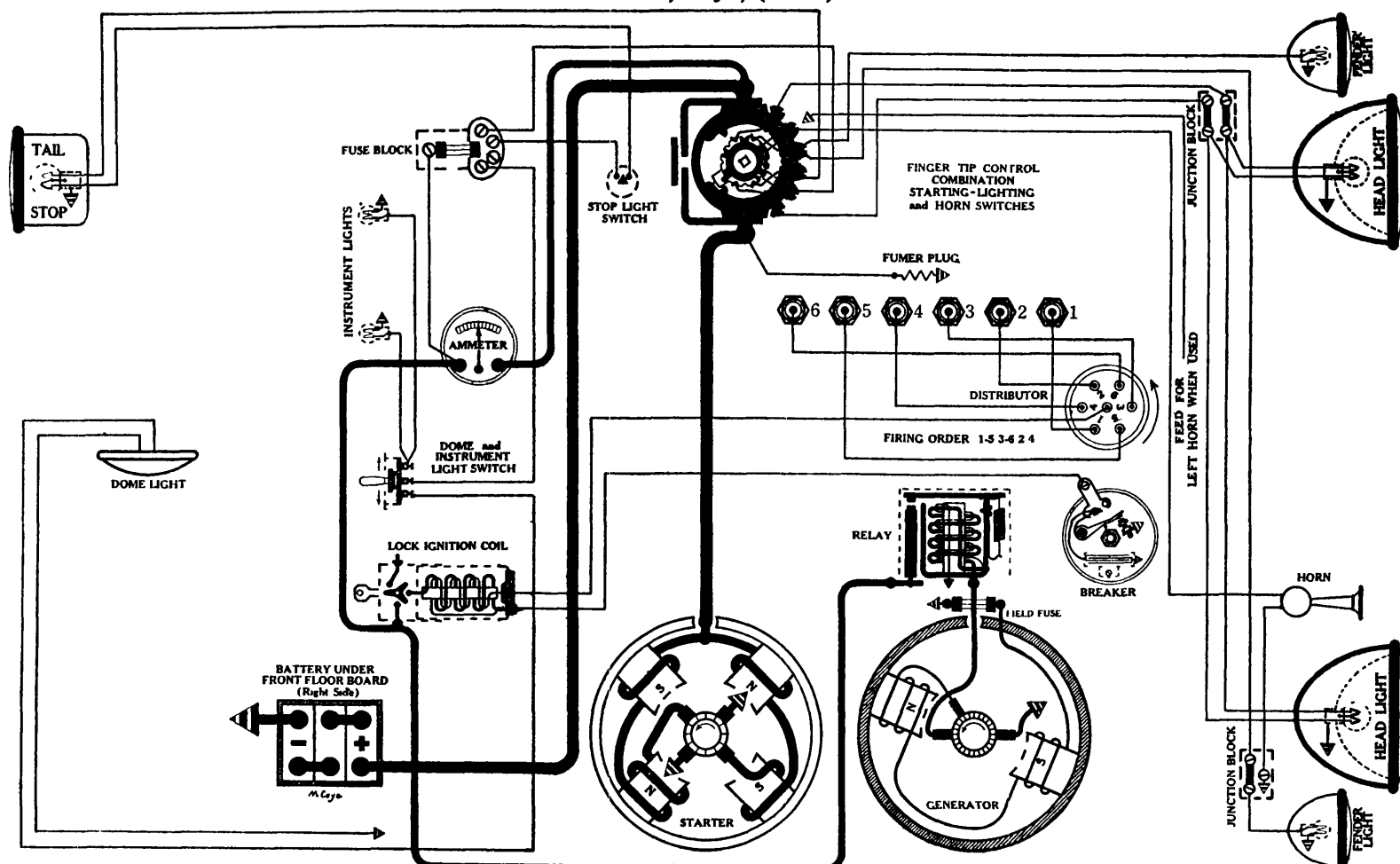
Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on block under engine hood (left side).

Lamps—See Lamp Table, Sec. AA. HEAD—1110 (Bifocal); FENDER—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

WILLYS-KNIGHT

Model 95, 6 cyl., (1932)

**BATTERY**

U. S. L., HW-13-A, 6 volts. Negative Terminal Grounded
 Starting Capacity—127 amps. for 20 minutes.
 Lighting Capacity—5.8 amps. for 20 hours.
 Box—Length, 10-7/32; width, 7 1/4; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAD-4115

Connection to Engine—Bendix Drive.
 Running Free—60 amps. at 5.5 volts, 3750 R.P.M.
 Cranking Engine—180 to 195 amps. at 4.8 volts.
 Lock Torque—13 pound-feet, 505 amps., 3 volts.
 Brush Spring Tension—44 to 56 oz. on each.
 Starting Switch—Located foot of steering column. Operated by pulling up on horn button.
 Armature—Auto-Lite, MAD-2083.

IGNITION

Rotation, L. H., Top View
 Auto-Lite, IGC-4045-A

Breakers—Contact separation .018 inch.
 Contact Spring Tension—17 to 19 oz.
Timing—IMPORTANT! Time ignition in full advance position. Remove all spark plugs with exception of No. 1. Slowly turn engine until No. 1 piston is coming up on compression stroke. (This is easily determined by resistance in No. 1 cylinder due to compression). Remove No. 1 spark plug. Remove flywheel inspection hole cover (found left side of flywheel housing). Continue to turn engine until flywheel mark "IGN", found 12 degrees before T.D.C., is opposite pointed end of timing indicator pin. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open. **WARNING!** There are two timing marks (one for right and one for left-hand drive cars). Use proper mark.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 100 and rod No. 6. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .058 inch before T.D.C., as indicated on Gauge. With rotor opposite No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—3/8 inch (Champion type C-1); Gap .022 inch.
Firing Order—1-5-3-6-2-4.
Manual Advance—20 degrees (on Flywheel).
Automatic Advance—15 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1000	4	500	2
1600	10	800	5
2200 (Max.)	15	1100	7 1/2

Lock Ignition Coil—Auto-Lite, IG-4501.

NOTE—This is a new type coil, with but one primary terminal at top, which should always be connected to the breaker. Two other primary terminals are located at base of coil, either one of which may be used for the "hot" feed, the other terminal is for the gas gauge or other auxiliary units.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAL-4303

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0.	650	6.5	10	1075	7.3
2	720	6.6	14	1340	7.7
5	850	7	16	1800 (Max.)	8

Motoring Freely—4 1/2 to 5 amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—4 1/2 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps. (type 1A-7 1/2).

Brush Spring Tension—10 to 13 oz. on each.

Armature—Auto-Lite, GAL-2062.

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Pines Finger Tip Control, No. A-803.

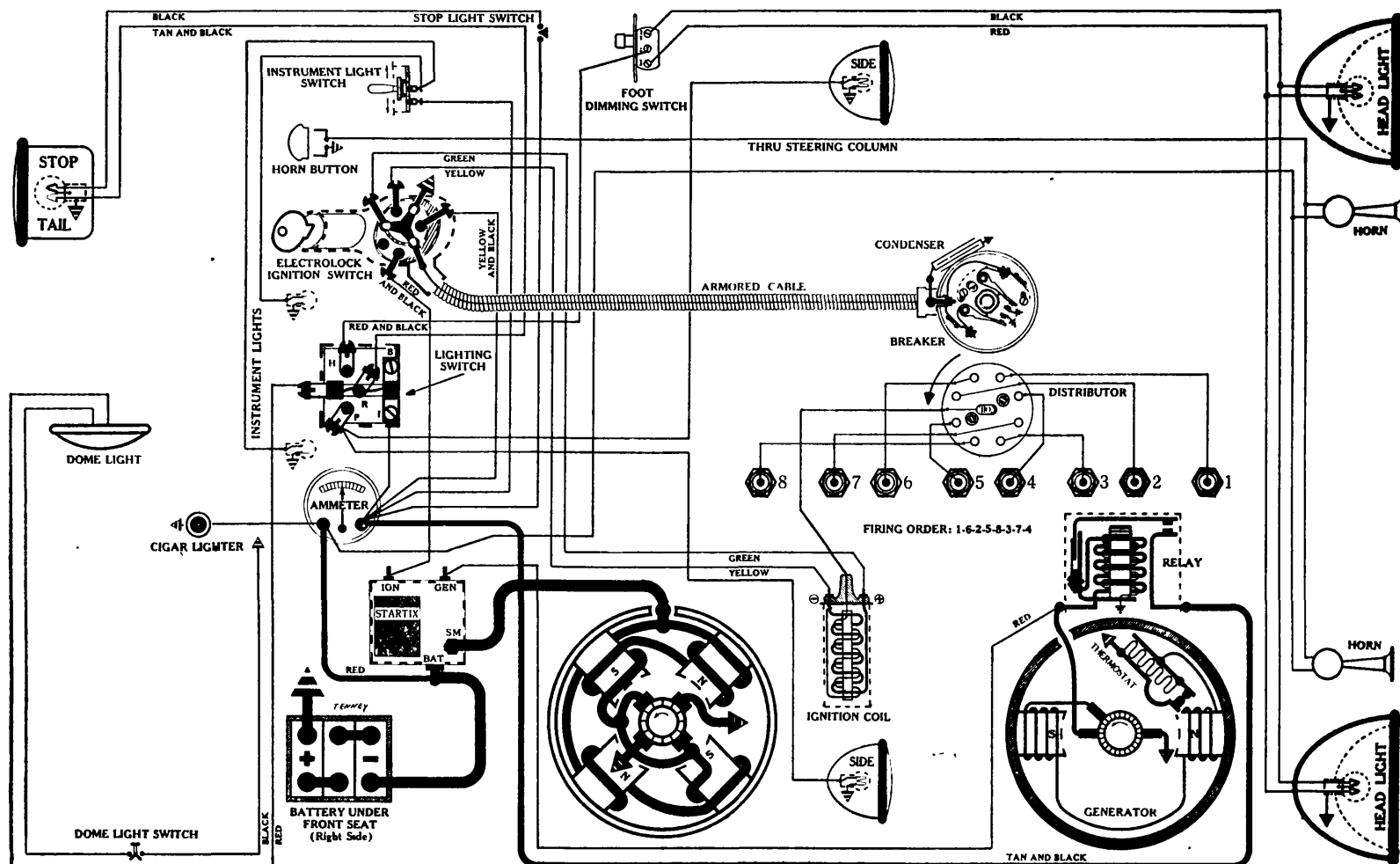
Location—Foot of steering column. This unit is a combination starting switch, lighting switch, and horn switch, all controlled by horn button on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on block under engine hood (left side).

Lamps—See Lamp Table, Sec. AA. **HEAD**—1110 (Bifocal); **FENDER**—63; **INSTRUMENT**—63; **DOME**—63; **STOP AND TAIL**—1158.

AUBURN

Models 8-101 Standard & Custom Series, 8-105 Salon Series, Straight Eights, (1933)



BATTERY

U.S.L., XY-15-A, 6 volts. Positive Terminal Grounded

Starting Capacity—119 amps. for 20 minutes.

Lighting Capacity—5.7 amps. for 20 hours.

Box—Length, 10¼; width, 7¼; height, 8½ inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 736-E

Connection to Engine—Bendix Drive, Type R11X-10.

Running Free—65 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—275 to 290 amps. at 3.7 volts.

Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.

Armature—Delco-Remy, 820626.

IGNITION

Rotation, L. H., Top View

Delco-Remy, 660-Z

Breakers—Contact separation .020 inch, or 56 cam degrees.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—IMPORTANT! Time ignition in full advance position.

Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when 12½ degrees, or 3¼ teeth ahead of T.D.C. (for engines with standard compression heads), or 8½ degrees which corresponds to 2¼ teeth (for high compression heads). With rotor under No. 1 Dist. Cap Terminal, stationary breaker points should just open.

Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .063 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal stationary set of breaker points should just open.

Spark Plugs—¾ inch (Champion type 2); Gap .026 to .028 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—26 degrees (on Flywheel).

Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
500	Start	250	Start
800	4	400	2
1600	14	800	7
2400	24	1200	12
2600 (Max.)	26½	1300	13

Ignition Coil—Delco-Remy, 528-C.

Ignition Switch—"Electrolock", type 15-S.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 955-H (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	15	1200	8.1
3	700	7.	20	1450 (Max.)	8.3
11	1000	7.9	19	1700	8.3

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Armature—Delco-Remy, 819976.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5670-A.

Location—Behind instrument board. Operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back.

Spare fuse in clip on switch support.

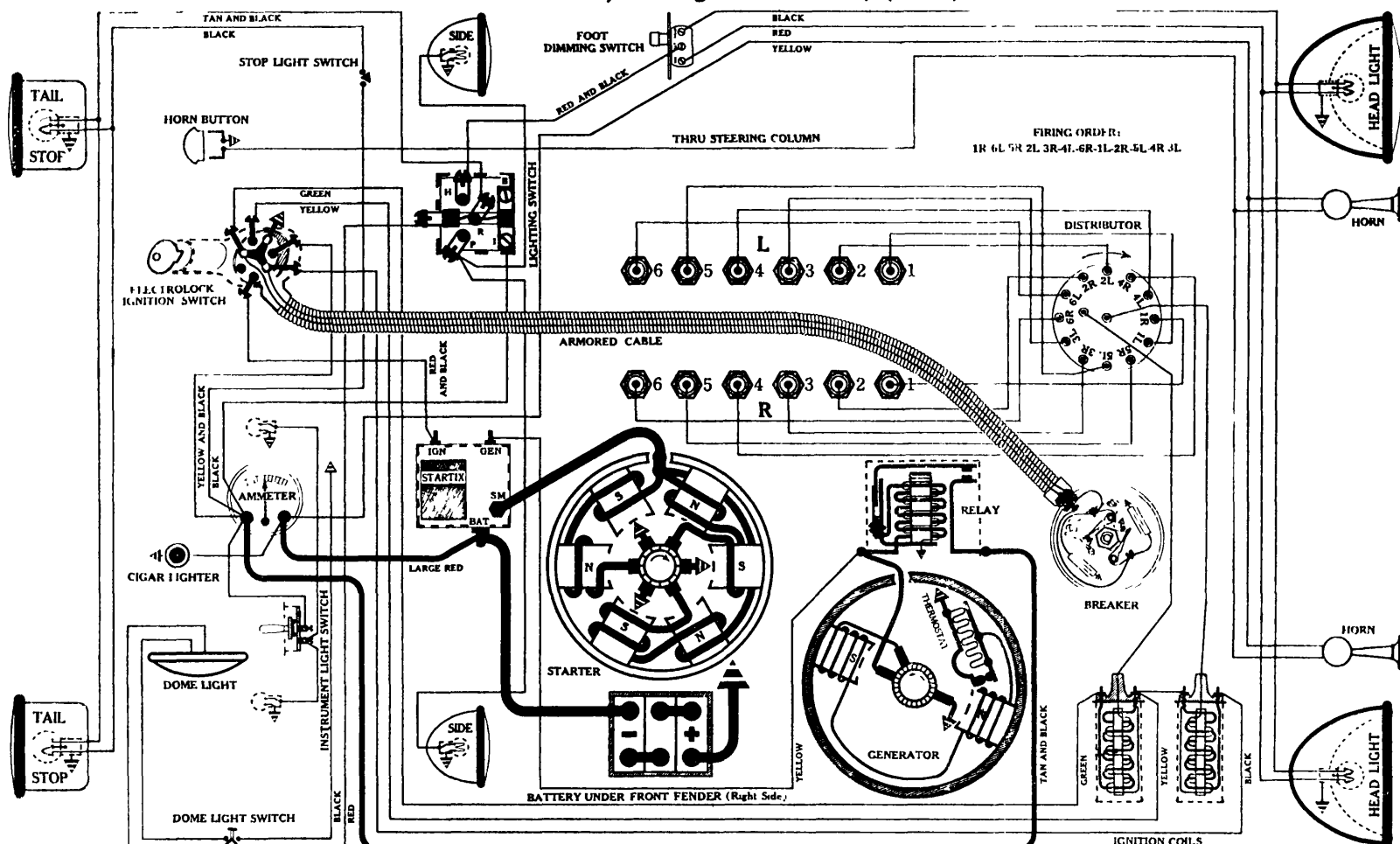
Foot Dimming Switch—Delco-Remy, 465-W.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1000; SIDE—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

AUBURN

Model 12-165, 45 D gree "Vee" 12, (1933)



BATTERY

U.S.L., XY-17-A, 6 volts. Positive Terminal Grounded

Starting Capacity—136 amps. for 20 minutes.
Lighting Capacity—6.6 amps. for 20 hours.
Box—Length, 11 $\frac{1}{2}$; width, 7 $\frac{1}{4}$; height, 8 $\frac{1}{2}$ inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 543

Connection to Engine—Bendix Drive, Type RB11XXV.
Running Free—70 amps. at 5 $\frac{1}{2}$ volts, 2200 R.P.M.
Cranking Engine—265 to 280 amps. at 4 volts.
Lock Torque—35 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—36 to 40 oz. on each.
Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.
Armature—Delco-Remy, 1837058.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 667-Z

Breakers—Contact separation .018 inch, or 18 cam degrees.
Contact Spring Tension—18 to 20 oz. on each.
Synchronizing—Movable points open 22 $\frac{1}{2}$ degrees after stationary. Unequal intervals of 22 $\frac{1}{2}$ -37 $\frac{1}{2}$ -22 $\frac{1}{2}$, etc. degrees between interruptions.
Timing—IMPORTANT! Time ignition in full advance position. Remove No. 1 spark plug from left cylinder block, and turn crankshaft (no provision made for hand cranking; place transmission in high, jack up rear wheel), until No. 1 piston, left block, is coming up on compression stroke. Stop when flywheel mark "D-1 & 6 L" is 3 $\frac{1}{2}$ teeth (equivalent to 10°) ahead of pointer on housing. With end of rotor which distributes current from center of cap, under No. 1L distributor cap outlet, movable set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1L spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 19. Slowly turn engine (by rear wheel) until No. 1L piston is coming up on compression stroke. Stop when .044 inch before T.D.C., as indicated on Gauge. With spark in full advance position movable set of breaker points should just open.
Spark Plugs—18-MM (Champion type C-7); Gap .025 inch.
Firing Order—1R-6L-5R-2L-3R-4L-6R-1L-2R-5L-4R-3L.
Manual Advance—25 degrees (on Flywheel).

Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1800	10	900	5
2500	16	1250	8
3200 (Max.)	20	1600	10

Ignition Coils—Delco-Remy, 528-C.
Ignition Switch—"Electrolock", type 15-SD.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 931-F

Performance Data—Gen. cold. Thermostat closed.					
Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	400	6.4	16	720	7.8
4	460	6.7	20	840	8.
12	600	7.4	23	1400 (Max.)	8.4

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—4 to 4 $\frac{1}{2}$ amps. at 6 volts.
Max Stall Current—24 to 26 amps. at 5 $\frac{1}{2}$ volts.
Field Test—3 $\frac{1}{2}$ amps. at 6 volts across field coils in series.
Brush Spring Tension—20 to 28 oz. on each.
Armature—Delco-Remy, 1844569.
Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

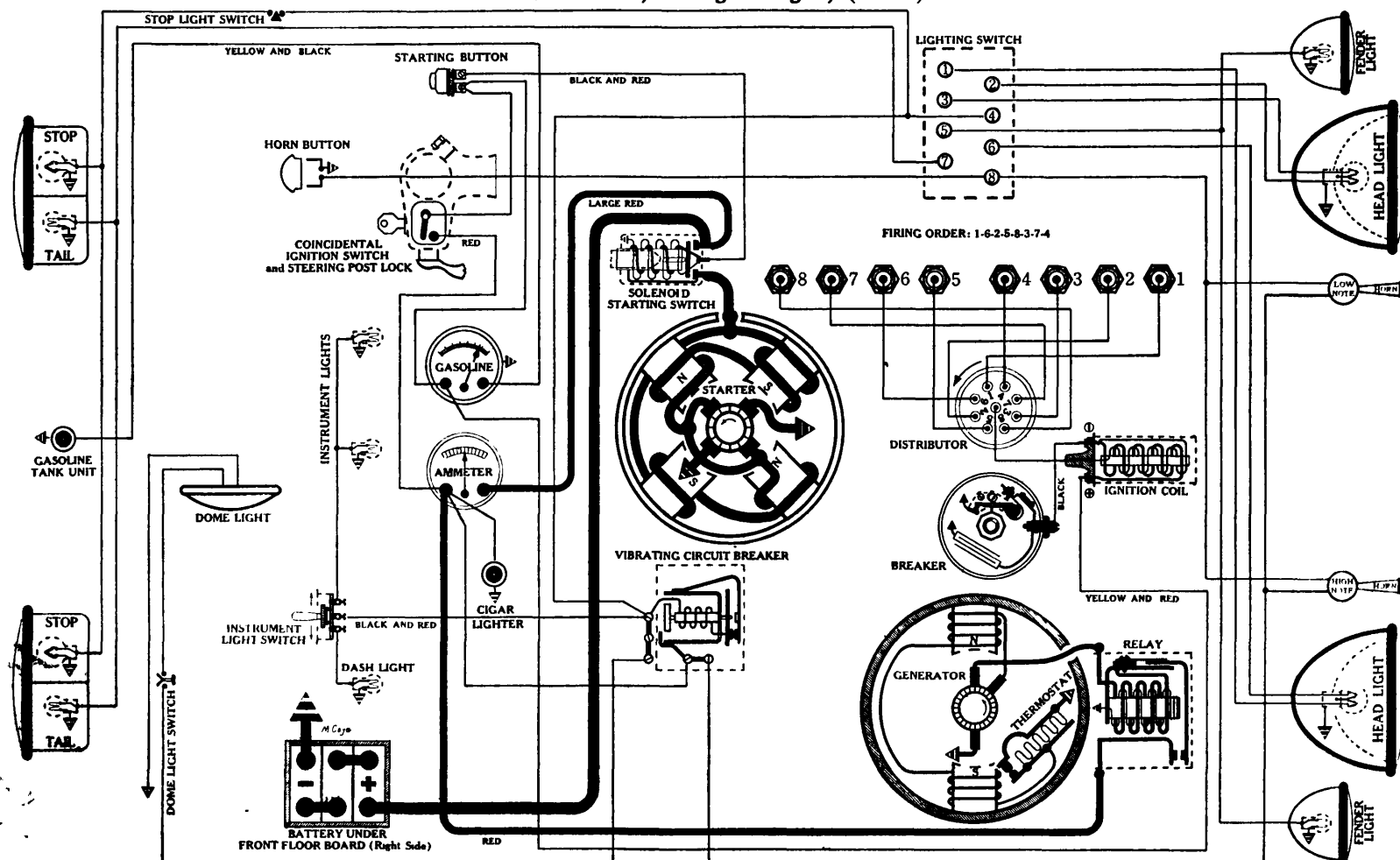
Closes—7 to 7 $\frac{1}{2}$ volts.
Opens—0 to 2 $\frac{1}{2}$ amps. discharge.
Contact Gap—.015 to .025 inch.
Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5670-A.
Location—Behind instrument board. Operated by pull knob.
Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back.
Spare fuse in clip on switch support.
Foot Dimming Switch—Delco-Remy, 465-W.
Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.
Lamps—See Lamp Table, Sec. AA. HEAD—1000; SIDE—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

BUICK

Model 33-50, Straight Eight, (1933)



BATTERY

Delco-Remy, 13-J, 6 volts. Negative Terminal Grounded

Starting Capacity—117 amps. for 20 minutes.

Lighting Capacity—4.9 amps. for 20 hours.

Box—Length, 9 1/16; width, 7; height, 9 1/8 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 725-V

Connection to Engine—Mechanical Gear Shift incorporating an over-running clutch, actuated by a solenoid mounted on starting motor, and controlled by a push button located on left side of instrument board.

Running Free—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—170 to 185 amps. at 4.1 volts.

Lock Torque—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy Solenoid, 1502.

Push Button Starting Control Switch—Delco-Remy, 1377.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, L. H., Top View

Delco-Remy, 661-L

Breaker—Contact separation .0125 to .0175 inch or from 15 to 18 cam degrees (Delco-Remy specifications).

Breaker—Contact separation .020 inch or 22 cam degrees (Buick specifications).

Contact Spring Tension—19 to 23 oz.

Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke, flywheel mark "Adv" (which is 7 degrees before T.D.C.) opposite index line, spark fully advanced, rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 113 and rod No. 31. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .018 inch before T.D.C., as indicated on Gauge. With spark in full advance position, rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (AC type J-12, low compression); Gap .025 to .030 inch.

18-MM (AC type H-9, high compression); Gap .020 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—24 degrees (on Flywheel).

Automatic Advance—21 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	Start	200	Start
500	3 1/2	250	1 1/4
620	8	310	4
800	14	400	7
1300	18	650	9
1600 (Max.)	21	800	10 1/2

Ignition Coil—Delco-Remy, 528-H.

Ignition Switch—Oakes Steering Post and Ignition Lock.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 956-B

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.3	16	1160	7.8
4	680	6.7	20	1520	8.
12	950	7.4	22	2000 (Max.)	8.3

NOTE—Thermostat opens about 165° F, reducing charging rate approx 30 to 40%.

Motoring Freely—3 amps. at 6 volts (without distributor).

Max. Stall Current—25 to 26 amps. at 6 volts.

Field Test—2.1 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz.

Armature—Delco-Remy, 1845920.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens 0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 487-B, Special Five Position "Multi-Beam" Switch (not interchangeable with previous models).

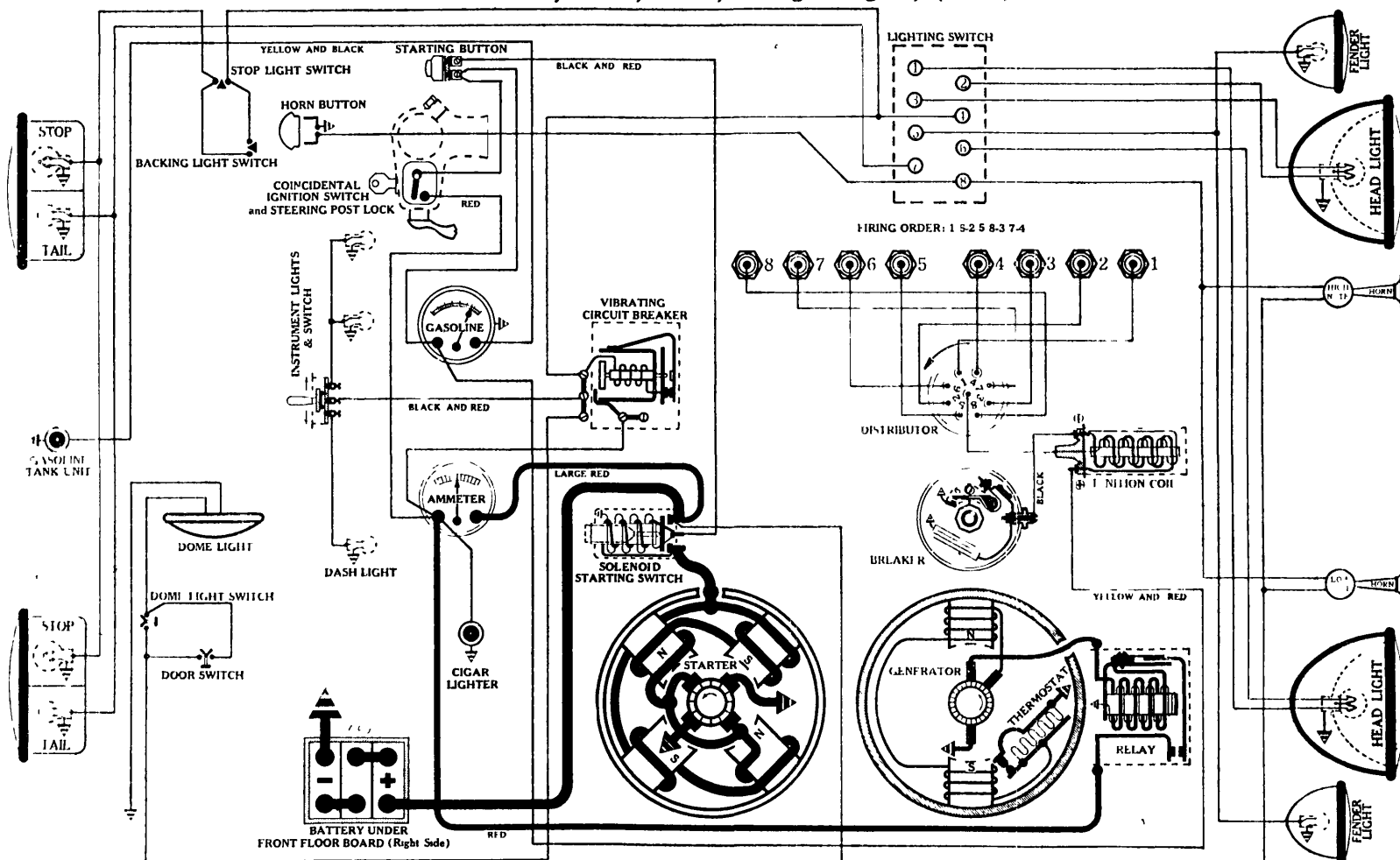
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-K. Starts to operate on discharge of 30 to 35 amps., and limits discharge current 5 to 18 amps. Max.

Lamps—See Lamp Table, Sec. AA. HEAD—1000; FENDER—63; TAIL—63; STOP—87; INSTRUMENT AND DASH—63; DOME—81.

BUICK

Models 33-60, 33-80, 33-90, Straight Eights, (1933)



BATTERIES

MODEL 33-60:—

Delco-Remy, 15-G, 6 volts. Negative Terminal Grounded
Starting Capacity—137 amps. for 20 minutes.
Lighting Capacity—5.7 amps. for 20 hours.
Box—Length, 10-9/32; width, 7; height, 9 1/4 inches.

MODELS 33-80, 33-90:—

Delco-Remy, 17-D, 6 volts. Negative Terminal Grounded
Starting Capacity—156 amps. for 20 minutes.
Lighting Capacity—6.5 amps. for 20 hours.
Box—Length, 11 1/4; width, 7; height, 9 3/8 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 725-W

Connection to Engine—Mechanical Gear Shift incorporating an over-running clutch, actuated by a solenoid mounted on starting motor, and controlled by a push button located on left side of instrument board.

Running Free—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—185 to 200 amps. at 4 volts.

Lock Torque—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy Solenoid, 1501.

Push Button Starting Control Switch—Delco-Remy, 1377.

Armature—Delco-Remy, 820158.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 661-K

Breaker Contact separation .0125 to .0175 inch, or from 15 to 18 cam degrees (Delco-Remy specifications).

Breaker—Contact separation .020 inch, or 22 cam degrees (Buick specifications).

Contact Spring Tension—19 to 23 oz.

Timing IMPORTANT! Time Ignition in full advance position. With No. 1 piston on compression stroke, flywheel mark "Adv" (which, on Model 33-60 is 11 degrees, and on Models 33-80 and 33-90 is 10 degrees before T.D.C.) opposite and a line, spark fully advanced, rotor under No. 1 Dist. Cap Terminal, breaker point should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 31. Slowly turn engine until No. 1 piston comes up on compression stroke. On Model 33-60 stop when .048 inch, and on Models 33-80 and 33-90 when .044 inch before T.D.C., as indicated on gauge. With spark in full advance position, rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (AC type J-12, low compression); Gap .025 to .030 inch.

18-MM (AC type H-9, high compression); Gap .020 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—24 degrees (on Flywheel).

Automatic Advance—30 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	Start	200	Start
500	3 1/2	250	1 1/4
800	14	400	7
1600	21	800	10 1/2
2160	26	1080	13
2600 (Max.)	30	1300	15

Ignition Coil—Delco-Remy, 528-H.

Ignition Switch—Oakes Steering Post and Ignition Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 956-B

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.3	16	1160	7.8
4	680	6.7	20	1520	8.
12	950	7.1	22	2000 (Max.)	8.3

NOTE—Thermostat opens about 165° F., reducing charging rate approx. 3% to 40%.

Motoring Freely—3 amps. at 6 volts (without distributor).

Max. Stall Current—25 to 26 amps. at 6 volts.

Field Test—2.1 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz.

Armature—Delco-Remy, 1845920.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265 B

Closes—7 to 7 1/2 volts.

Opens 0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 487-B, Special Five Position "Multi-Beam" Switch (not interchangeable with previous models).

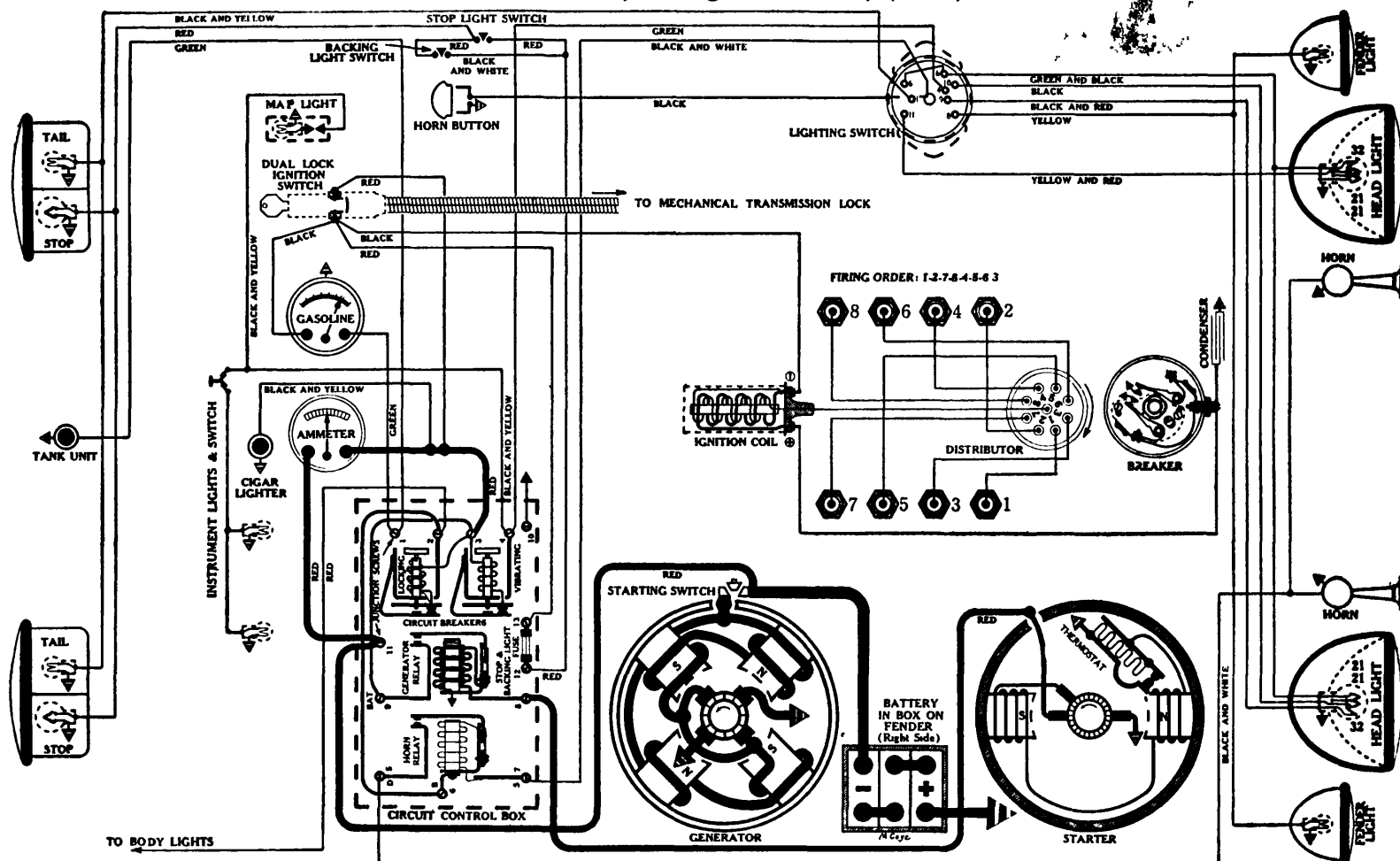
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-K. Starts to operate on discharge of 30 to 35 amps. and limits discharge current 5 to 18 amps. Max.

Lamps—See Lamp Table, Sec. AA. HEAD—1000; FENDER—63; TAIL—63; STOP AND BACK—87; INSTRUMENT AND DASH—63; DOME—81.

CADILLAC

Model 355-C, 90 degree "V" 8, (1933)



BATTERY

Delco-Remy, 17-C, 6 volts. Positive Terminal Grounded
Starting Capacity—156 amps. for 20 minutes.
Lighting Capacity—6.5 amps. for 20 hours.
Box—Length, 11 $\frac{3}{4}$; width, 7; height, 9 $\frac{1}{2}$ inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 728-P

Connection to Engine—Mechanical Gear Shift, incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter. Gear reduction job.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—245 to 260 amps. at 4 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 662-Y

(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch, or 56 cam degrees.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.

Timing—With No. 1 piston on compression stroke, flywheel mark "IG-A" (which is 13/16 inches ahead of T.D.C.) opposite indicator, rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 29. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .036 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—18-MM (AC type G-7); Gap .025 to .028 inch.

Firing Order—1-2-7-8-4-5-6-3.

NOTE—All odd cylinder numbers on right bank, No. 1 nearest radiator. All even numbers on left bank (see diagram).

Automatic Advance—11 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
450	Start	225	Start
500	2	250	1
700	4	350	2
900	6	450	3
1000	7 $\frac{1}{2}$	500	3 $\frac{1}{2}$
1600 (Max.)	11	800	5 $\frac{1}{2}$

Ignition Coil—Delco-Remy, 528-G.

Ignition Switch—Delco-Remy, 426-T "Dual Lock". (Combination Ignition Switch and Mechanical Transmission Lock).

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-S (Air Cooled)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	450	6.4	16	720	7.8
8	540	7.	20	840	8.
12	600	7.4	24	1400 (Max.)	8.4

NOTE—Thermostat opens about 165 F., reducing charging rate approx 31 to 40%.

Motoring Freely—4 $\frac{1}{2}$ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 6 volts.

Field Test—4 $\frac{1}{2}$ amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1843113.

Third Brush Adjustment—Loosen cover band. Loosen long hexagonal screw which releases third brush mounting plate, shift brush by hand; relock.

RELAY

Located in Delco-Remy, 480-Z Circuit Control Box
Together with Circuit Breakers and Horn Relay
Mounted on Dash under Cowl

Closes—7 to 7 $\frac{1}{2}$ volts.

Opens—0 to 2 $\frac{1}{2}$ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-S, or 487-A.

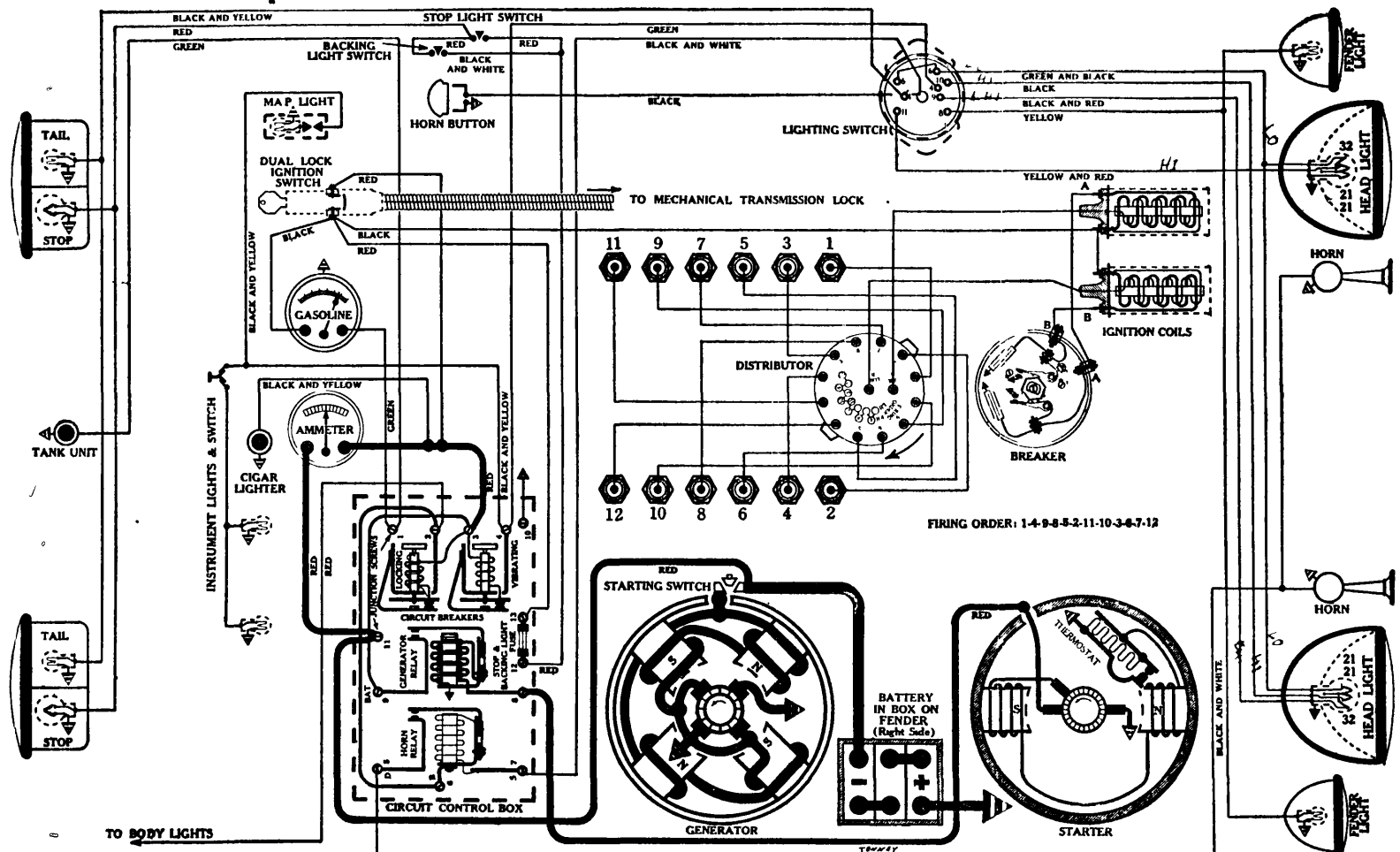
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Circuit Breakers—Vibrating unit—Starts 35 to 40 amps. Operates 5 to 15 amps. Lock-out unit—Opens 25 to 30 amps. Operates with discharge less than 1 amp.

Lamps—See Lamp Table, Sec. AA. HEAD—3001; FENDER—63; INSTRUMENT—63; MAP LIGHT—63; CORNER—81; DOME—87; TAIL—63; STOP AND BACK—87.

CADILLAC

Mod 1 370-C, 45 degree "Vee" 12, (1933)



BATTERY

Delco-Remy, 21-C, 6 volts. Positive Terminal Grounded

Starting Capacity—195 amps. for 20 minutes.

Lighting Capacity—8.2 amps. for 20 hours.

Box—Length, 13-9/16; width, 7; height, 9-3/16 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 495

Connection to Engine—Mechanical Gear Shift, incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter.

Running Free—70 amps. at 5½ volts, 2200 R.P.M.

Cranking Engine—265 to 280 amps. at 4 volts.

Lock Torque—35 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—36 to 40 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 1837058.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 4110

(Full Automatic Spark Advance)

Breakers—Contact separation .018 inch, or 17 cam degrees.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 37½ degrees after stationary. Unequal intervals of 37½-22½-37½, etc. degrees between interruptions.

Timing—With No. 1 piston on compression stroke, flywheel mark "IG-A" (which is 1-13/16 inches ahead of T.D.C.) opposite indicator, rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 113 and rod No. 33. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .076 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—18-MM (AC type G-7); Gap .025 to .028 inch.

Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.

NOTE—All odd cylinder numbers on left bank, No. 1 nearest radiator. All even numbers on right bank (see diagram).

Automatic Advance—42 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	Start	200	Start
500	2½	250	1
920	12	460	6
1600	28	800	14
2200 (Max.)	42	1100	21

Ignition Coils—Delco-Remy, 526-E.

Ignition Switch—Delco-Remy, 426-T "Dual Lock". (Combination Ignition Switch and Mechanical Transmission Lock).

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 931-D, (Air Cooled)

Performance Data—Gen. cld. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	450	6.4	16	720	7.8
8	540	7.	20	840	8.
12	600	7.4	24	1450 (Max.)	8.4

NOTE—Thermostat opens about 165° F., reducing charging rate approx 30 to 40%.

Motoring Freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 6 volts.

Field Test—3½ amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1841674.

Third Brush Adjustment—Loosen cover band. Loosen long hexagonal screw which releases third brush mounting plate, shift brush by hand; relock.

RELAY

Located in Delco-Remy, 480-Z Circuit Control Box (Together with Circuit Breakers and Horn Relay)

Mounted on Dash under Cowl

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-S, or 487-A.

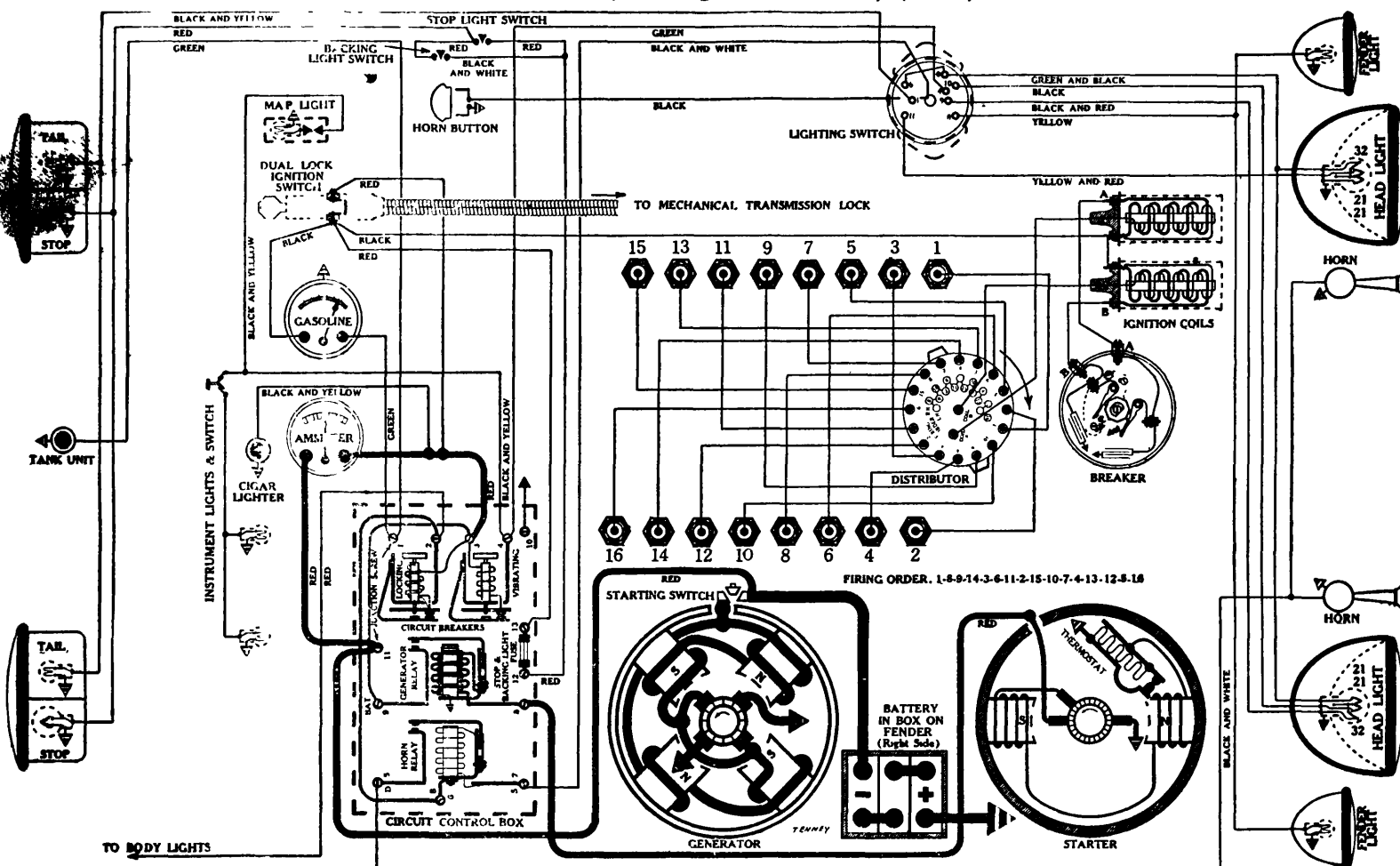
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Circuit Breakers—Vibrating unit—Starts 35 to 40 amps. Operates 5 to 15 amps. Lock-out unit—Opens 25 to 30 amps. Operates with discharge less than 1 amp.

Lamps—See Lamp Table, Sec. AA. HEAD—3001; FENDER—63; INSTRUMENT—63; MAP LIGHT—63; CORNER—81; DOME—87; TAIL—63; STOP AND BACK—87.

CADILLAC

Model 452-C, 45 degree "Vee" 16, (1933)



BATTERY

Delco-Remy, 25-A, 6 volts. Positive Terminal Grounded
 Starting Capacity—234 amps. for 20 minutes.
 Lighting Capacity—9.8 amps. for 20 hours.
 Box—Length, 16-3/16; width, 7; height, 9-3/16 inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 495

Connection to Engine—Mechanical Gear Shift, incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter.

Running Free—70 amps. at 5½ volts, 2200 R.P.M.

Cranking Engine—265 to 280 amps. at 4 volts.

Lock Torque—35 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—36 to 40 oz. on each.

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 1837058.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 4111

(Full Automatic Spark Advance)

Breakers—Contact separation .015 inch, or 16 cam degrees.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 22½ degrees after stationary. Equal 22½ degree intervals between interruptions.

Timing—With No. 1 piston on compression stroke, flywheel mark "IG-A" (which is 1¼ inches ahead of T.D.C.) opposite indicator, rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 113 and rod No. 33. Slowly turn engine (by rear wheel) until No. 1 piston is coming up on compression stroke. Stop when .037 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—18-MM (AC type D-8); Gap .025 to .028 inch.

Firing Order—1-8-9-14-3-6-11-2-15-10-7-4-13-12-5-16.

NOTE—All odd cylinder numbers on left bank, No. 1 nearest radiator. All even numbers on right bank (see diagram).

Automatic Advance—28 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	Start	200	Start
500	1½	250	¾
1200	12	600	6
1800	22	900	11
2200 (Max.)	28	1100	14

Ignition Coils—Delco-Remy, 530-K.

Ignition Switch—Delco-Remy, 426-T "Dual Lock". (Combination Ignition Switch and Mechanical Transmission Lock).

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 931-D, (Air Cooled)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	450	6.4	16	720	7.8
4	500	6.7	20	840	8.
12	600	7.4	24	1450 (Max.)	8.4

NOTE—Thermostat opens about 165° F., reducing charging rate approx 30 to 40%.

Motoring Freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 6 volts.

Field Test—3½ amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1841674.

Third Brush Adjustment—Loosen cover band. Loosen long hexagonal screw which releases third brush mounting plate, shift brush by hand; relock.

RELAY

Located in Delco-Remy, 480-Z Circuit Control Box
 (Together with Circuit Breakers and Horn Relay)
 Mounted on Dash under Cowl

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-S, or 487-A.

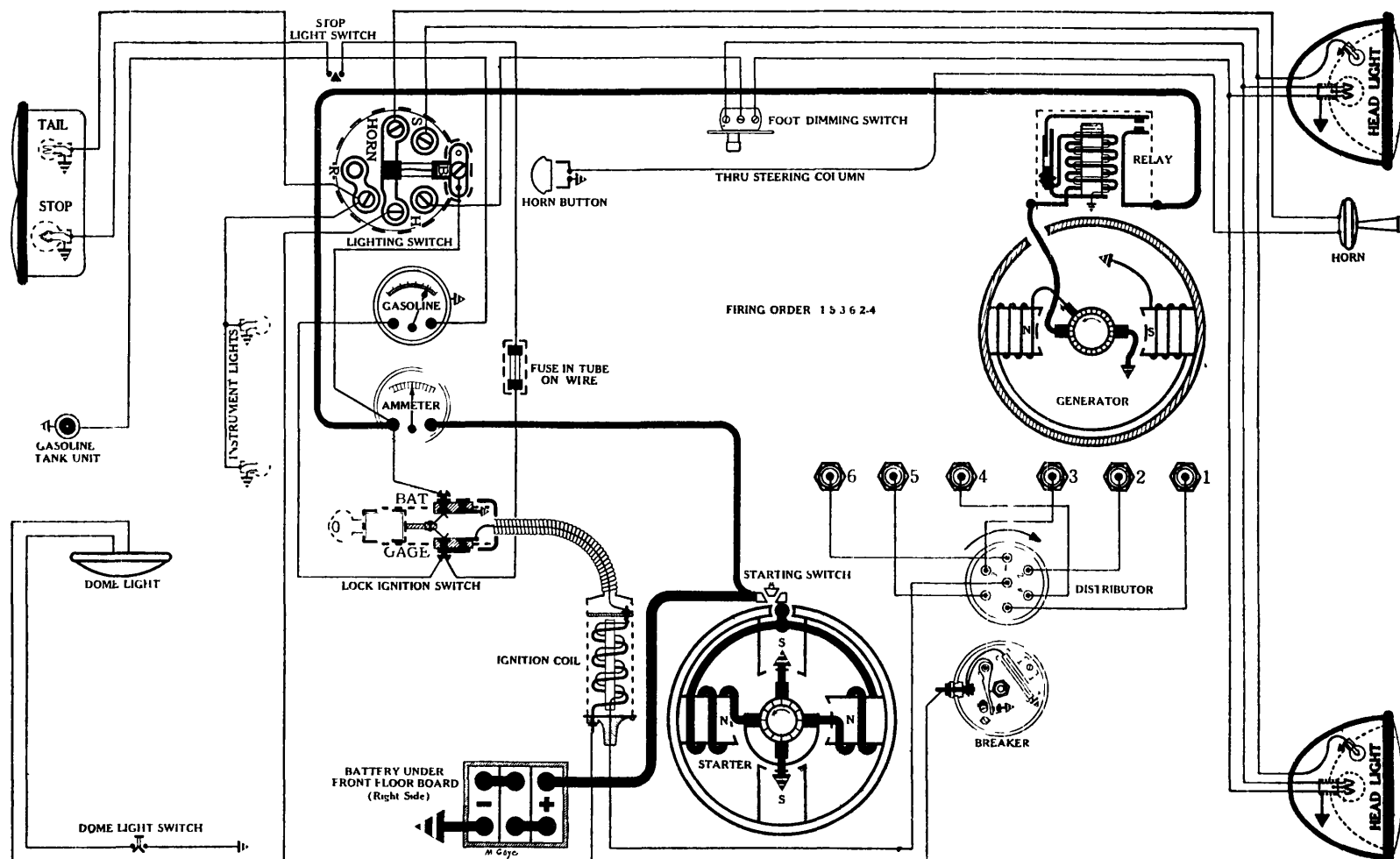
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Circuit Breakers—Vibrating unit—Starts 35 to 40 amps. Operates 5 to 15 amps. Lock-out unit—Opens 25 to 30 amps. Operates with discharge less than 1 amp.

Lamps—See Lamp Table, Sec. AA. HEAD—3001; FENDER—63; INSTRUMENT—63; MAP LIGHT—63; CORNER—81; DOME—87; TAIL—63; STOP AND BACK—87.

CHEVROLET

Model "Eagle", Series CA, (1933)



BATTERY

Delco-Remy, 13-N, 6 volts. Negative Terminal Grounded
Starting Capacity—102 amps. for 20 minutes.
Lighting Capacity—4.3 amps. for 20 hours.
Box—Length, 9-11/16; width, 7-1/16; height, 8-11/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-L

Connection to Engine—Bendix Drive, Type R11-10.
Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—165 to 175 amps. at 4.3 volts.
Lock Torque—12 pound-feet, 475 amps., 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 362941 (on starter).
Starterator Vacuum Unit—Delco-Remy, 1575.
Armature—Delco-Remy, 818002.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 644-D

(Full Automatic Spark Advance in Conjunction with Delco-Remy 680-F Vacuum Advance)

Breaker—Contact separation .020 inch, or 25 cam degrees.
Contact Spring Tension—17 to 21 oz.

Timing—IMPORTANT! First set pointer on octane selector at zero graduation. With No. 1 piston coming up on compression stroke, flywheel mark (which is found 10 degrees or 2½ flywheel teeth before T.D.C.) opposite pointer, rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—IMPORTANT! First set pointer on octane selector at zero graduation. Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 113 in conjunction with special 14-MM fitting No. 151 and rod No. 19. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston is .035 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-9); Gap .032 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance—12 degrees (on Flywheel).

Octane Selector—10 degrees advance or retard (on Flywheel).

Automatic Advance—38½ degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	Start	200	Start
550	2	275	1
1500	16	750	8
2400 (Intermediate)	28½	1200	14
2800 (Max.)	38½	1400	19

Ignition Coil and Lock Switch Assembly—Delco-Remy, 536-W.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 943-J, (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	16	1650	8.
5	850	7.1	18	1850 (Max.)	8.2
12	1250	7.8	17	2000	8.2

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—3½ amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 817221.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-II

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-H.

Location—Behind instrument board. Operated by pull knob.

Fuses—Lighting Circuit, Single 20 amp. fuse (type 3A-20) mounted on switch back. Stop Light Circuit, Single 20 amp. fuse (type 3A-20) in tubular holder in wire behind instrument board near ignition switch.

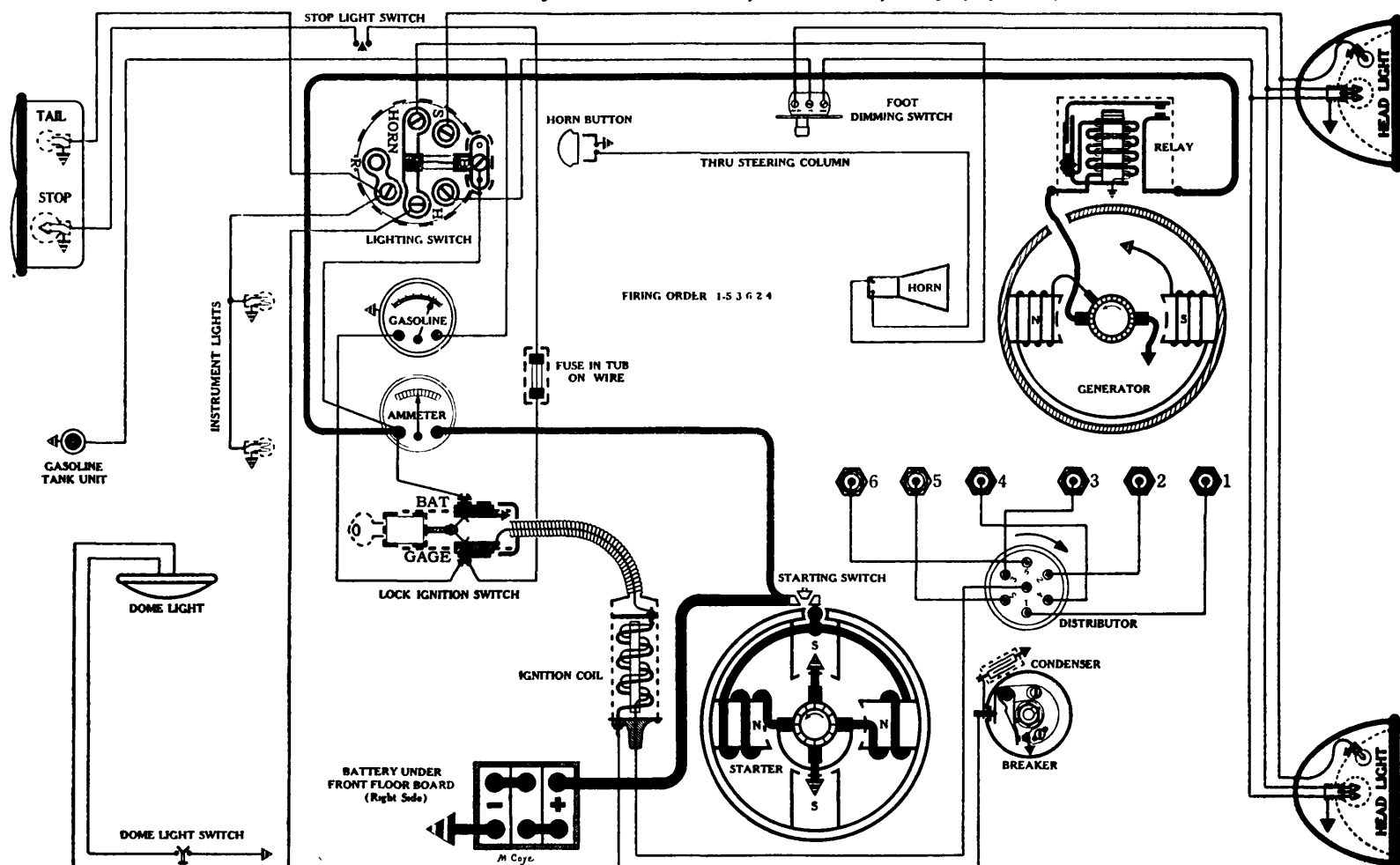
Foot Dimming Switch—Delco-Remy, 465-W, or 465-Z.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; AUX.—63; STOP—87; TAIL—63; INSTRUMENT—63; DOME—63.

CHEVROLET

Model "Mercury" Standard Line, Series CC, 6 cyl., (1933)



BATTERY

Delco-Remy, 13-N, 6 volts. Negative Terminal Grounded
Starting Capacity—102 amps. for 20 minutes.
Lighting Capacity—4.3 amps. for 20 hours.
Box—Length, 9-11/16; width, 7-1/16; height, 8-11/16 inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 714-L

Connection to Engine—Bendix Drive, Type R11-10.
Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—165 to 175 amps. at 4.3 volts.
Lock Torque—12 pound-feet, 475 amps., 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 362941 (on starter).
Starterator Vacuum Unit—Delco-Remy, 1575.
Armature—Delco-Remy, 818002.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 622-L

(Full Automatic Spark Advance in Conjunction with Delco-Remy 680-F Vacuum Advance)

Breaker—Contact separation .020 inch, or 25 cam degrees.
Contact Spring Tension—17 to 21 oz.

Timing—IMPORTANT! First set pointer on octane selector at zero graduation. With No. 1 piston coming up on compression stroke, flywheel mark (which is found 10 degrees or 2½ flywheel teeth before T.D.C.) opposite pointer, rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—IMPORTANT! First set pointer on octane selector at zero graduation. Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 113 in conjunction with special 14-MM fitting No. 151 and rod No. 19. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston is .035 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-9); Gap .032 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance—12 degrees (on Flywheel).

Octane Selector—10 degrees advance or retard (on Flywheel).

Automatic Advance—32 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1120	8	560	4
1650	16	825	8
2200	24	1100	12
2700 (Max.)	32	1350	16

Ignition Coil and Lock Switch Assembly—Delco-Remy, 536-W.

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 943-J, (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	16	1650	8.
5	850	7.1	18	1850 (Max.)	8.2
12	1250	7.8	17	2000	8.2

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—3½ amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 817221.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-H

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-H.

Location—Behind instrument board. Operated by pull knob.

Fuses—Lighting Circuit, Single 20 amp. fuse (type 3A-20) mounted on switch back. Stop Light Circuit, Single 20 amp. fuse (type 3A-20) in tubular holder in wire behind instrument board near ignition switch.

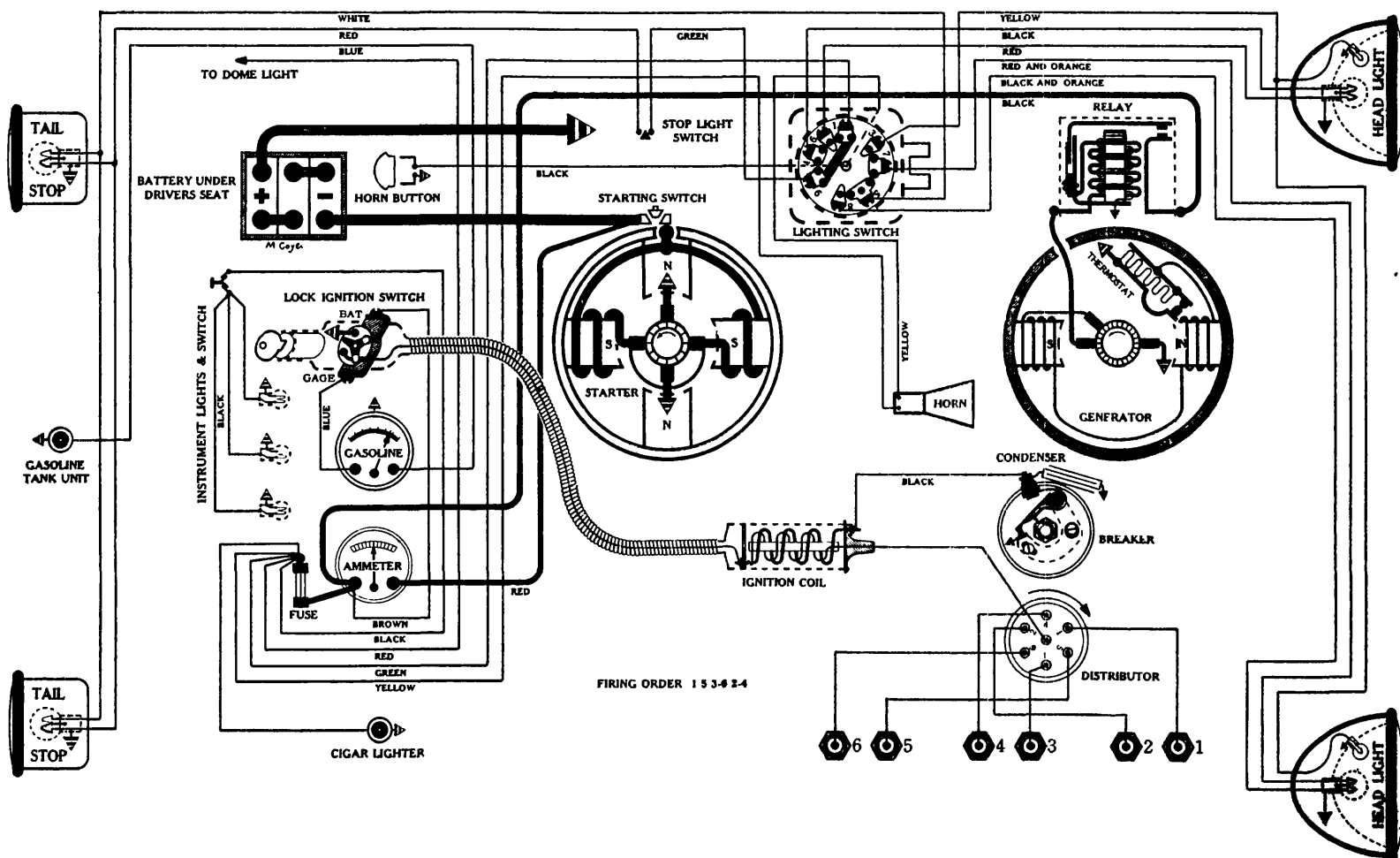
Foot Dimming Switch—Delco-Remy, 465-Z.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; AUX.—63; STOP—87; TAIL—63; INSTRUMENT—63; DOME—63.

CHRYSLER

Model CO, 6 cyl., (Early 1933)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—122 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 734-L

Connection to Engine—Mechanical Gear Shift in conjunction with Delco-Remy 1550 Vacuum Coincidental Starter Control.
Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—165 to 185 amps. at 4.2 volts.
Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each.
Armature—Delco-Remy, 1848389.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 622-C

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch, or 25 cam degrees.
Contact Spring Tension—17 to 21 oz.
Timing—Remove inspection cover plate located on left side of flywheel housing, directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "DC" coincides with "Ign. 10" pointer on timing indicator plate. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove the 1/4 inch pipe plug (located above No. 6 piston) and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12, or remove No. 1 spark plug and attach Gauge, using adapter No. 114 and rod No. 2 (standard head) or rod No. 42 (red head). Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .043 inch before T.D.C. (standard head) or .027 inch before T.D.C. (red head), as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—14-MM (AC type K-12), Standard Head; Gap .025 inch.
14-MM (AC type K-10), Red Head; Gap .025 inch.
Firing Order—1-5-3-6-2-4.

Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1260	4	630	2
1700	8	850	4
2150	12	1075	6
2600 (Max.)	16	1300	8

Coil and Lock Switch Assembly—Delco-Remy, 537-U.

GENERATORS

Rotation, L. H., Com. End
Delco-Remy 937-E or 943-S, (Belt Drive)
(For 943-S Data see Early 1933 DeSoto, Model SD)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	15	1300	7.8
5	950	6.8	20	1600	8.4
10	1100	7.2	24	2400 (Max.)	8.5

NOTE—Thermostat opens about 165° F, reducing charging rate approx. 30 to 40%.

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 5.5 volts.

Field Test—3 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9454 (Special Five Position "Flex-Beam" Switch, not interchangeable with previous models).

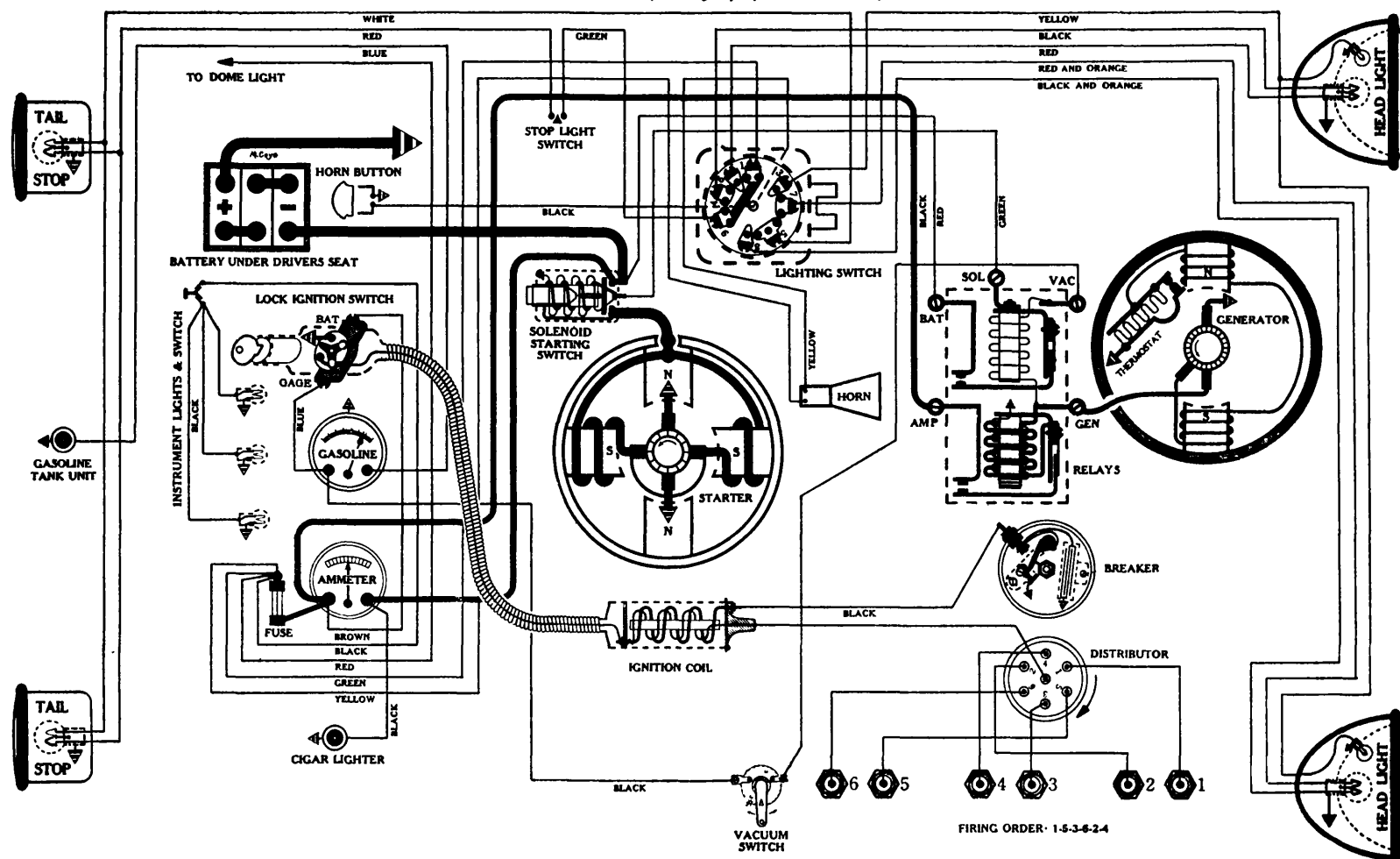
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20) mounted vertically beside ammeter, behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; AUX.—63; INSTRUMENT—63; DOME—87; STOP AND TAIL—1158.

CHRYSLER

Model CO, 6 cyl., (Late 1933)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded
 Starting Capacity—122 amps. for 20 minutes.
 Lighting Capacity—5 amps. for 20 hours.
 Box—Length, 10-5/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 734-R

Connection to Engine—Mechanical Gear Shift incorporating an over-running clutch, actuated by a solenoid mounted under starting motor, and controlled by the foot accelerator, by means of a vacuum switch and auxiliary relay on generator.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—165 to 185 amps. at 4.2 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy Solenoid, 1504.

Vacuum Starting Control Switch—Delco-Remy, 1585.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 644-L

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch, or 25 cam degrees.

Contact Spring Tension—17 to 21 oz.

Timing—Remove inspection cover plate located on left side of flywheel housing directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "DC" coincides with "DC" mark on timing indicator plate. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove the 3/8 inch pipe plug (located above No. 6 piston) and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12, or remove No. 1 spark plug and attach Gauge, using adapter No. 114 and rod No. 2 (standard head) or rod No. 42 (red head). Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C. (standard head) or .002 inch after T.D.C. (red head), as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-12), Standard Head; Gap .025 inch.

14-MM (AC type K-10), Red Head; Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—26 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Degrees Advance (on cam)
450	Start	225
500	2	250
660	8	330

840	15	420	7 1/2
1400	20	700	10
1900	24	950	12
2200 (Max.)	26	1100	13

Coil and Lock Switch Assembly—Delco-Remy, 537-U.

GENERATORS

Rotation, L.H., Com. End

Delco-Remy 937-F or 937-D, (Belt Drive)

(For 937-D Data see 1933 Chrysler, Model CT)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	15	1300	7.8
5	950	6.8	20	1600	8.4
10	1100	7.2	24	2400 (Max.)	8.5

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 5.5 volts.

Field Test—3 1/2 amps. at 6 volts, across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAYS

Delco-Remy, 264-D

(Combination Cut-Out Relay and Starter Remote Control Relay)

Cut-out Relay:

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

Remote Control Relay:

Closes—4.3 to 4.7 volts.

Opens—At 2 volts or less.

Contact Gap—.050 to .055 inch.

Core Gap—.007 to .009 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9454 (Special Five Position "Flex-Beam" Switch, not interchangeable with previous models).

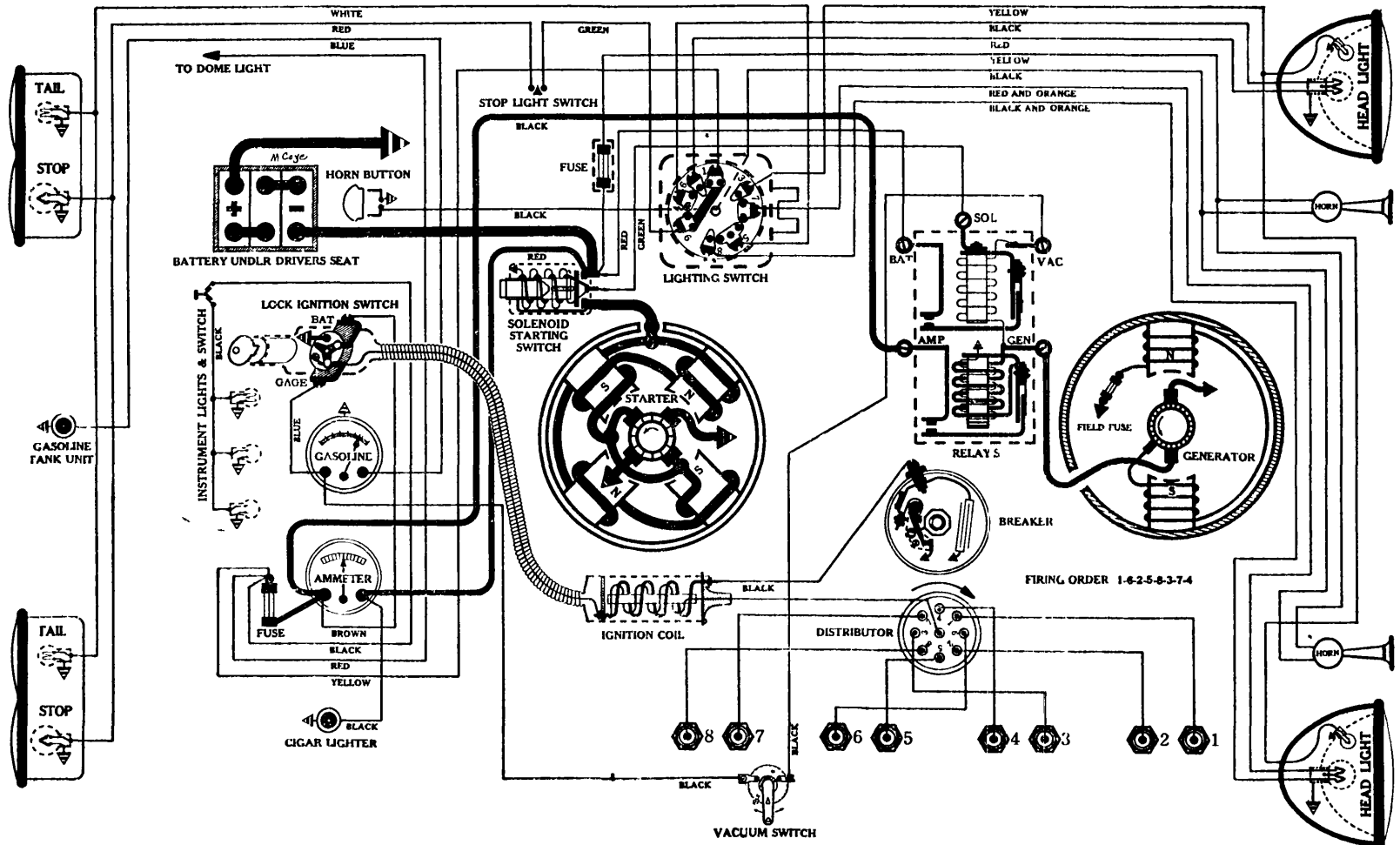
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20) mounted vertically beside ammeter, behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; AUX.—63; INSTRUMENT—63; DOME—87; STOP AND TAIL—1158.

CHRYSLER

Model CT, Straight Eight, (1933)



BATTERY

Willard, WH-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—140 amps. for 20 minutes.
Lighting Capacity—5.7 amps. for 20 hours.
Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 725-Z

Connection to Engine—Mechanical Gear Shift incorporating an over-running clutch, actuated by a solenoid mounted under starting motor, and controlled by the foot accelerator, by means of a vacuum switch and auxiliary relay on generator.

Running Free—60 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—160 to 180 amps. at 4 volts.

Lock Torque—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy Solenoid, 1504.

Vacuum Starting Control Switch—Delco-Remy, 1585.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 661-R

(Full Automatic Spark Advance)

Breaker—Contact separation .016 inch, or 17 cam degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Remove inspection cover plate, located on left side of flywheel housing, directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "DC" coincides with "DC" mark on timing indicator plate. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove the 3/4 inch pipe plug (located above No. 8 piston), and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12. Remove No. 1 spark plug and attach Gauge, using adapter No. 114 and rod No. 29 (standard head) or rod No. 42 (red head). Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .001 inch before T.D.C. (standard head) or exact T.D.C. (red head), as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-12), Standard Head; Gap .025 inch.

14-MM (AC type K-10), Red Head; Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—28 degrees (on Flywheel).

Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance
(on flywheel) (on cam)

450	Start	225	Start
500	2	250	1
660	8	330	4

800	14	400	7
1500	20	750	10
1940	24	970	12
2400 (Max.)	28	1200	14

Coil and Lock Switch Assembly—Delco-Remy, 537-U.

GENERATORS

Rotation, L. H., Com. End
Delco-Remy 937 D or 937 F, (Belt Drive)
(For 937-F Data see Late 1933 Chrysler, Model CO)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	775	6.5	15	1340	7.8
5	900	6.8	20	1840	8.4
10	1100	7.2	21	2400 (Max.)	8.4

Motoring freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 5.5 volts.

Field Test—3½ amps. at 6 volts across field coils in series.

Field Fuse—5 amp. (Type 7A-5).

NOTE—937 D Generators above Serial No. 12,000 equipped with field fuse.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco Remy, 1338448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAYS

Delco-Remy, 264-D

(Combination Cut-Out Relay and Starter Remote Control Relay)

Cut-out Relay:

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

Remote Control Relay:

Closes—4.3 to 4.7 volts.

Opens—At 2 volts or less.

Contact Gap—.050 to .055 inch.

Core Gap—.007 to .009 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9454 (Special Five Position "Flex-Beam" Switch, not interchangeable with previous models).

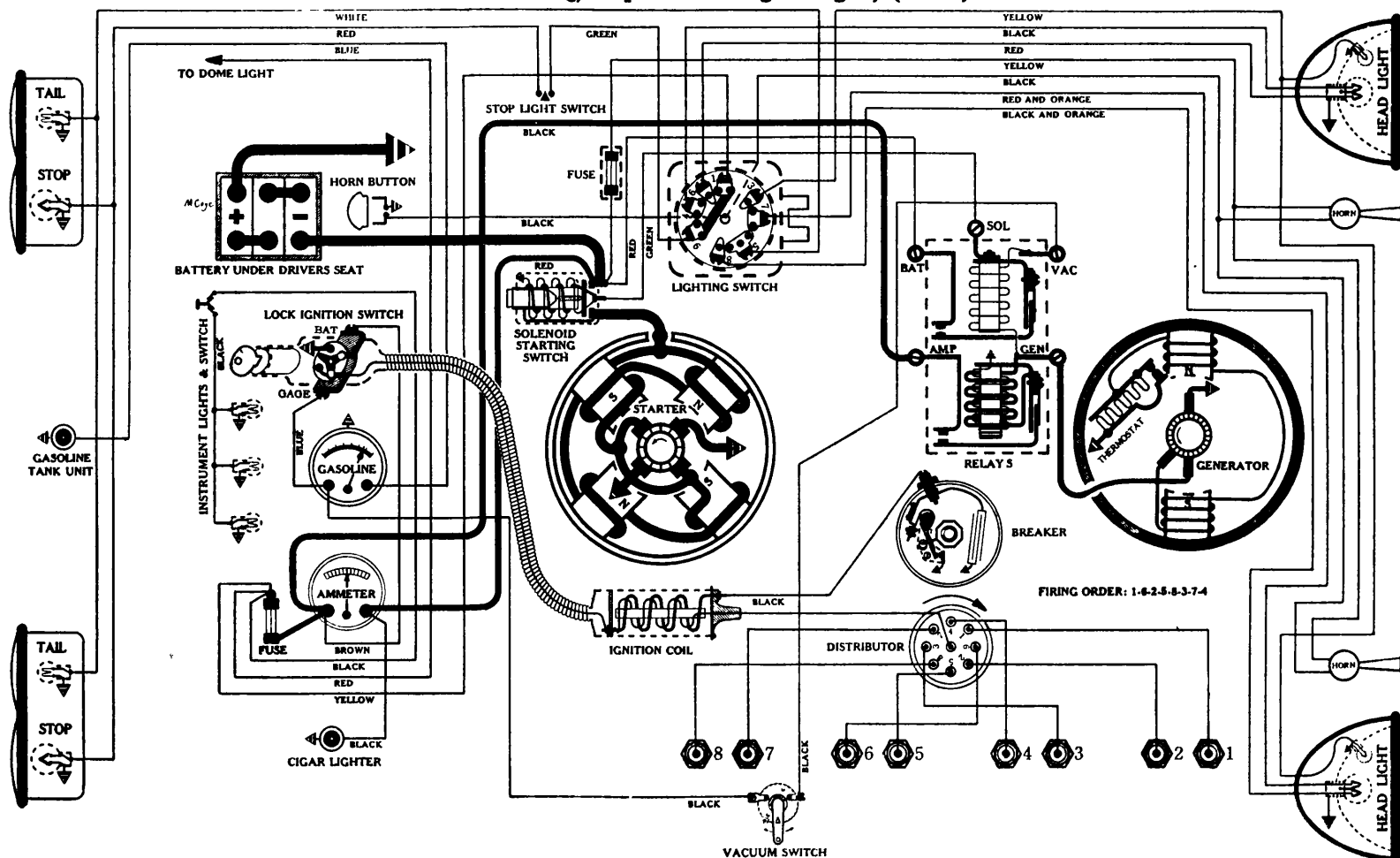
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20) mounted vertically beside ammeter, behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; AUX.—63; INSTRUMENT—63; DOME—87; TAIL—63; STOP—87.

CHRYSLER

Mod 1 CQ, Imperial Straight Eight, (1933)



BATTERY

Willard, WS 4 17, 6 volts. Positive Terminal Grounded
Starting Capacity—140 amp. for 20 minutes.
Lighting Capacity—5.7 amp. for 20 hours.
Box—Length, 11-11/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Delco Remy, 723 Z

Connection to Engine—Mechanical Gear Shift incorporating an over-running clutch, actuated by a solenoid mounted under starting motor, and controlled by the foot accelerator, by means of a vacuum switch and auxiliary relay on generator.

Running Free—60 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—160 to 180 amp. at 4 volts.

Lock Torque—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy Solenoid, 1504.

Vacuum Starting Control Switch—Delco-Remy, 1585.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 661-T

(Full Automatic Spark Advance)

Breaker—Contact separation .016 inch, or 17 cam degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Remove inspection cover plate located on left side of flywheel housing directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "DC" coincides with "Ign" mark on timing indicator plate. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove the 1/2 inch pipe plug (located above No. 8 piston) and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12, or remove No. 1 spark plug, and attach Gauge, using adapter No. 114 and rod No. 29 (standard head) or rod No. 42 (red head). Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .002 inch after T.D.C. (standard head) or .011 inch after T.D.C. (red head), as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-12), Standard Head; Gap .025 inch.

14-MM (AC type K-10), Red Head; Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—26 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on Flywheel)	Degrees Advance (on cam)	Dist. R.P.M.	Degrees Advance (on cam)
400	Start	200	Start	
500	4	250	2	

620	8	310	4
800	14	400	7
1700	20	850	10
2600 (Max.)	26	1300	13

Coil and Lock Switch Assembly—Delco-Remy, 537-U.

GENERATORS

Rotation, L. H., Com. End

Delco Remy 937-F or 937-D. (Belt Drive)

(For 937-D Data see 1933 Chrysler, Model (T))

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	15	1300	7.8
5	950	6.8	20	1600	8.4
10	1100	7.2	24	2400 (Max.)	8.5

NOTE—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 5.5 volts.

Field Test—3 1/2 amps. at 6 volts, across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAYS

Delco-Remy, 264-D

(Combination Cut-Out Relay and Starter Remote Control Relay)

Cut-out Relay:

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

Remote Control Relay:

Closes—4.3 to 4.7 volts.

Opens—At 2 volts or less.

Contact Gap—.050 to .055 inch.

Core Gap—.007 to .009 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9454 (Special Five Position "Flex-Beam" Switch, not interchangeable with previous models).

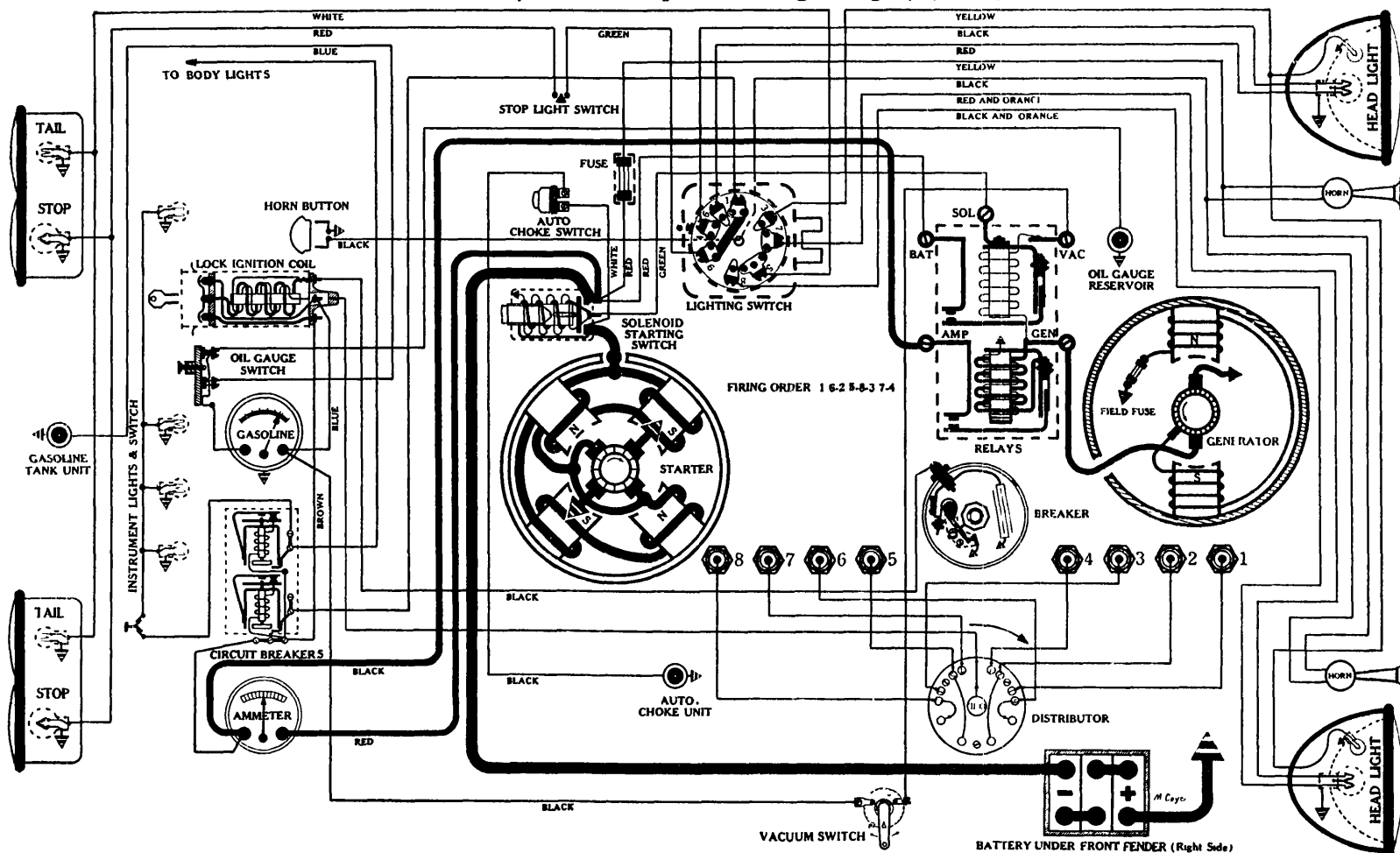
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20) mounted vertically beside ammeter, behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; AUX.—63; INSTRUMENT—63; DOME—87; TAIL—63; STOP—87.

CHRYSLER

Mod 1 CL, Custom Imperial Straight Eight, (1933)



BATTERY

Willard, WS-4-17, 6 volts. Positive Terminal Grounded
 Starting Capacity—140 amps. for 20 minutes.
 Lighting Capacity—5.7 amps. for 20 hours.
 Box—Length, 11-11/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 728-T

Connection to Engine—Mechanical Gear Shift incorporating an over-running clutch, actuated by a solenoid mounted on starting motor and controlled by the foot accelerator by means of a vacuum switch and auxiliary relay on generator. This is a gear reduction job.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—160 to 180 amps. at 4.2 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy Solenoid, 1505.

Vacuum Starting Control Switch—Delco-Remy, 1585.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 661-U

(Full Automatic Spark Advance)

Breaker—Contact separation .016 inch, or 17 cam degrees.

Contact Spring Tension—19 to 23 oz.

Timing with MOTOR GAUGE—IMPORTANT! Time ignition in full advance position. Remove the 1/8 inch pipe plug (located above No. 8 piston), and at each MOTOR GAUGE, using adapter No. 103 and rod No. 12, or remove No. 1 spark plug and attach Gauge, using adapter No. 114 and rod No. 29. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .038 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cup Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-12); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—32 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
450	Start	225	Start
500	2	250	1
660	8	330	4
800 (Intermediate)	14	400	7
1500	20	750	10
2400	28	1200	14
2800 (Max.)	32	1400	16

Lock Ignition Coil—Delco-Remy, 534-R.

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 967-A, (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	11	1200	7.9
3	825	6.8	15	1400	8.
5	1000	7.2	18	2000 (Max.)	8.2

Motoring Freely—2½ to 3 amps. at 6 volts.

Max. Stall Current—21 to 24 amps. at 6 volts.

Field Test—1½ amps. at 6 volts across field coils in series.

Field Fuse—3 amps. (type 7A-3).

NOTE—967 A Generators above Serial No. 200 equipped with field fuse.

Brush Spring Tension—19 to 23 oz. on each.

Armature—Delco-Remy, 1840941.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAYS

Delco-Remy, 261-D

(Combination Cut-Out Relay and Starter Remote Control Relay)

Cut-out Relay:

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

Remote Control Relay:

Closes—4.3 to 4.7 volts.

Opens At 2 volts, or less.

Contact Gap—.050 to .055 inch.

Core Gap—.007 to .009 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9454 (Special Five Position "Flex-Beam" Switch, not interchangeable with previous models).

Location—Foot of steering column. Lights controlled by lever on steering wheel.

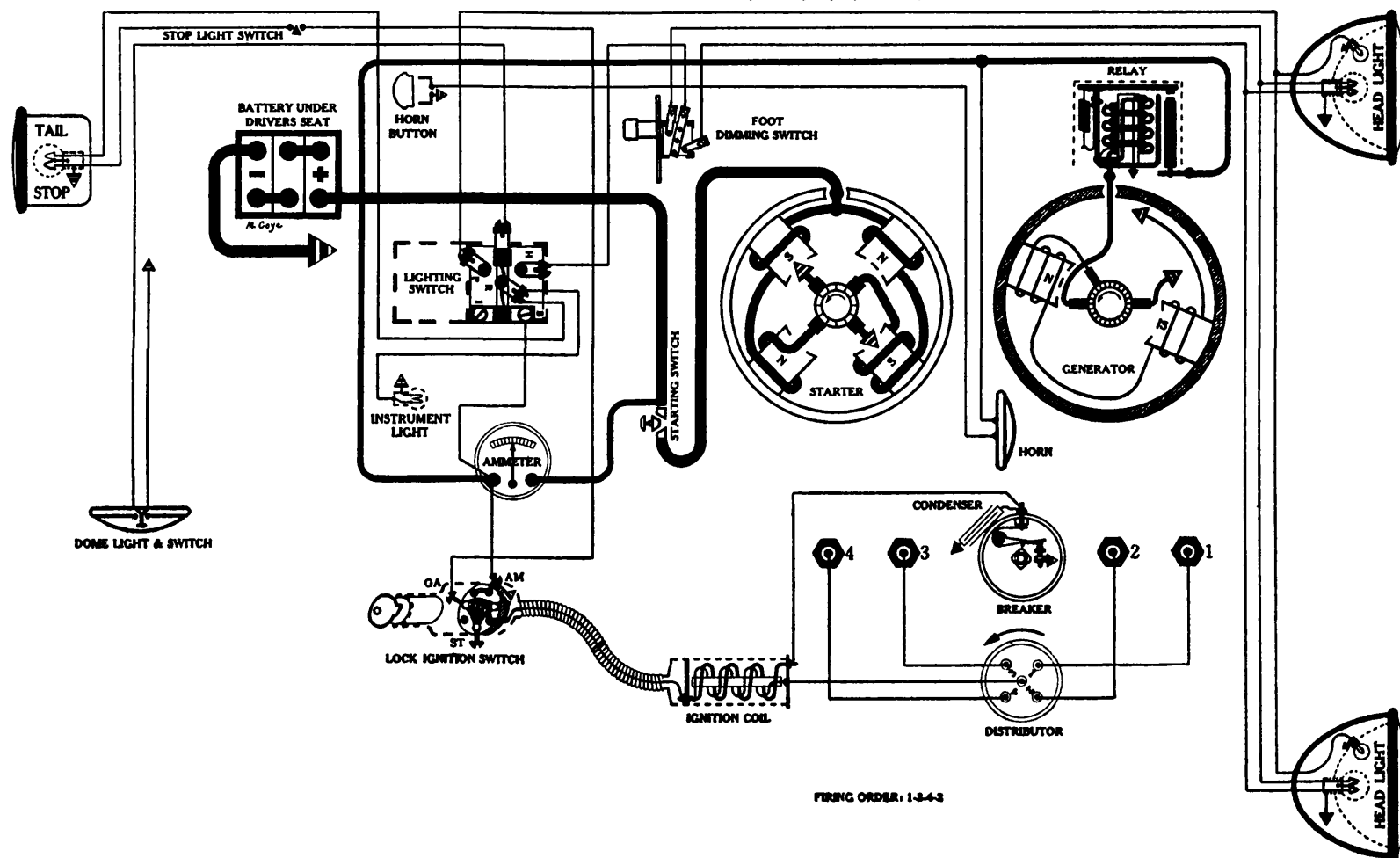
Vibrating Circuit Breakers—Delco-Remy, 410-H. Start—25 to 30 amps. Operates—10 to 15 amps.

Fuses—Horn Circuit, Single 20 amp. fuse (type 3A-20) in tubular holder in wire connected to starting solenoid.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; AUX.—63; INSTRUMENT—63; DOME—87; STOP—87; TAIL—63.

CONTINENTAL

Model 40 "BEACON", 4 cyl., (1933)



BATTERY

U.S.L., A-13 A, 6 volts. Negative Terminal Grounded

Starting Capacity—90 amps. for 20 minutes.

Lighting Capacity—3.9 amps. for 20 hours.

Box—Length, 9; width, 7; height, 8½ inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MZ 4034

Connection to Engine—Bendix Drive, Type LC11 10.

Running Free—70 amps. at 5½ volts, 4300 R.P.M.

Cranking Engine—135 to 150 amps. at 4½ volts.

Lock Torque—7.8 pound-feet, 420 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each.

Starting Switch—Auto Lite, SW-4001.

Armature—Auto-Lite, MZ-2053.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGB-4201
(Full Automatic Spark Advance)

Breaker—Contact separation .018 inch, or 47 cam degrees.

Contact Spring Tension—17 to 19 oz.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2.

Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .005 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (AC type G-10); Gap .025 inch.

Firing Order—1-3-4-2.

Automatic Advance—26 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
500	Start	250	Start
800	10	400	5
1400	16	700	8
1800	20	900	10
2400 (Max.)	26	1200	13

Coil and Lock Switch Assembly—Auto-Lite, IG-4606.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAM-4505, (Belt Drive)

Performance Data—Gen. Cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.4	12	1320	7.4
4	880	6.8	16	1860	7.8
8	1060	7.1	17	2400 (Max.)	8.

Motoring Freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—23 amps. at 5.9 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 20 oz. on main; 20 to 24 oz. on third.

Armature—Auto-Lite, GAM-2081.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5670-AA.

Location—Behind instrument board. Operated by pull knob.

Fuses—Single 20 amp. (type 3A-20), mounted on switch back.

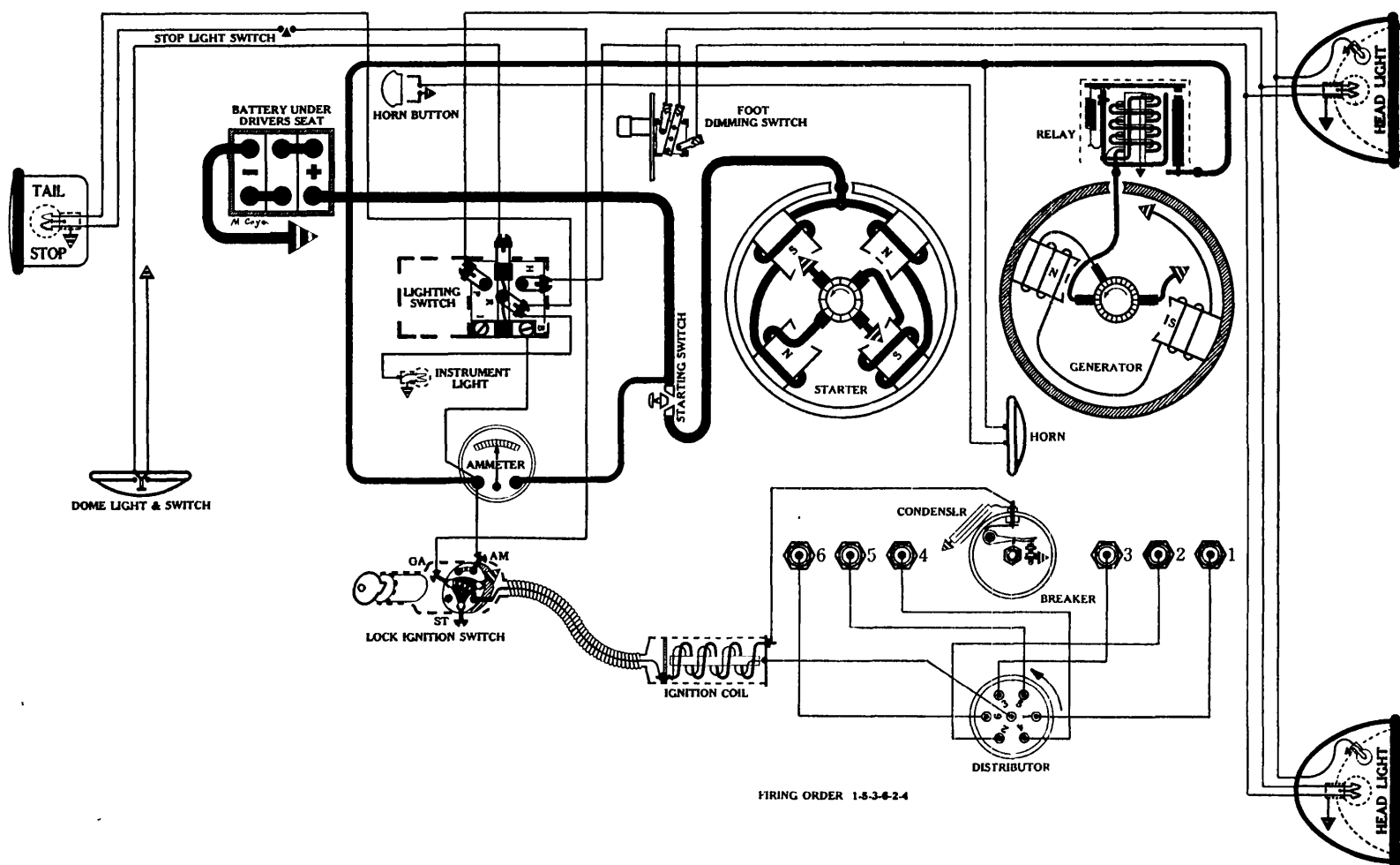
Foot Dimming Switch—Soreng-Manegold, No. A2100-A.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; AUX.—63; INSTRUMENT—63; STOP AND TAIL—1158.

CONTINENTAL

Mod 1 60 "Flyer", 6 cyl., (1933)



FIRING ORDER 1-5-3-6-2-4

BATTERY

U.S.L., XY-13-A, 6 volts. Negative Terminal Grounded
 Starting Capacity—102 amps. for 20 minutes.
 Lighting Capacity—4.3 amps. for 20 hours.
 Box—Length, 9; width, 7¼; height, 8½ inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MZ-4034

Connection to Engine—Bendix Drive, Type LC11-10.
 Running Free—70 amps. at 5½ volts, 4300 R.P.M.
 Cranking Engine—135 to 150 amps. at 4½ volts.
 Lock Torque—7.8 pound-feet, 420 amps. at 3 volts.
 Brush Spring Tension—44 to 56 oz. on each.
 Starting Switch—Auto-Lite, SW-4001.
 Armature—Auto-Lite, MZ-2053.

IGNITION

Rotation, L. H., Top View
 Auto-Lite, IGB-4083

(Full Automatic Spark Advance)

Breaker—Contact separation .018 inch, or 26 cam degrees.
 Contact Spring Tension—17 to 19 oz.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .001 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (AC type G-10); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—22 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
550	0	275	0
800	4	400	2
1300	8	650	4
1700	12	850	6
2400	20	1200	10
2600 (Max.)	22	1300	11

Coil and Lock Switch Assembly—Auto-Lite, IG-4606.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAM-4505, (Belt Drive)

Performance Data—Gen. Cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.4	12	1320	7.4
4	880	6.8	16	1860	7.8
8	1060	7.1	17	2400 (Max.)	8.

Motoring Freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—23 amps. at 5.9 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 20 oz. on main; 20 to 24 oz. on third.

Armature—Auto-Lite, GAM-2081.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng Manegold, No. 5670-AA.

Location—Behind instrument board. Operated by pull knob.

Fuses—Single 20 amp. (type 3A-20), mounted on switch back.

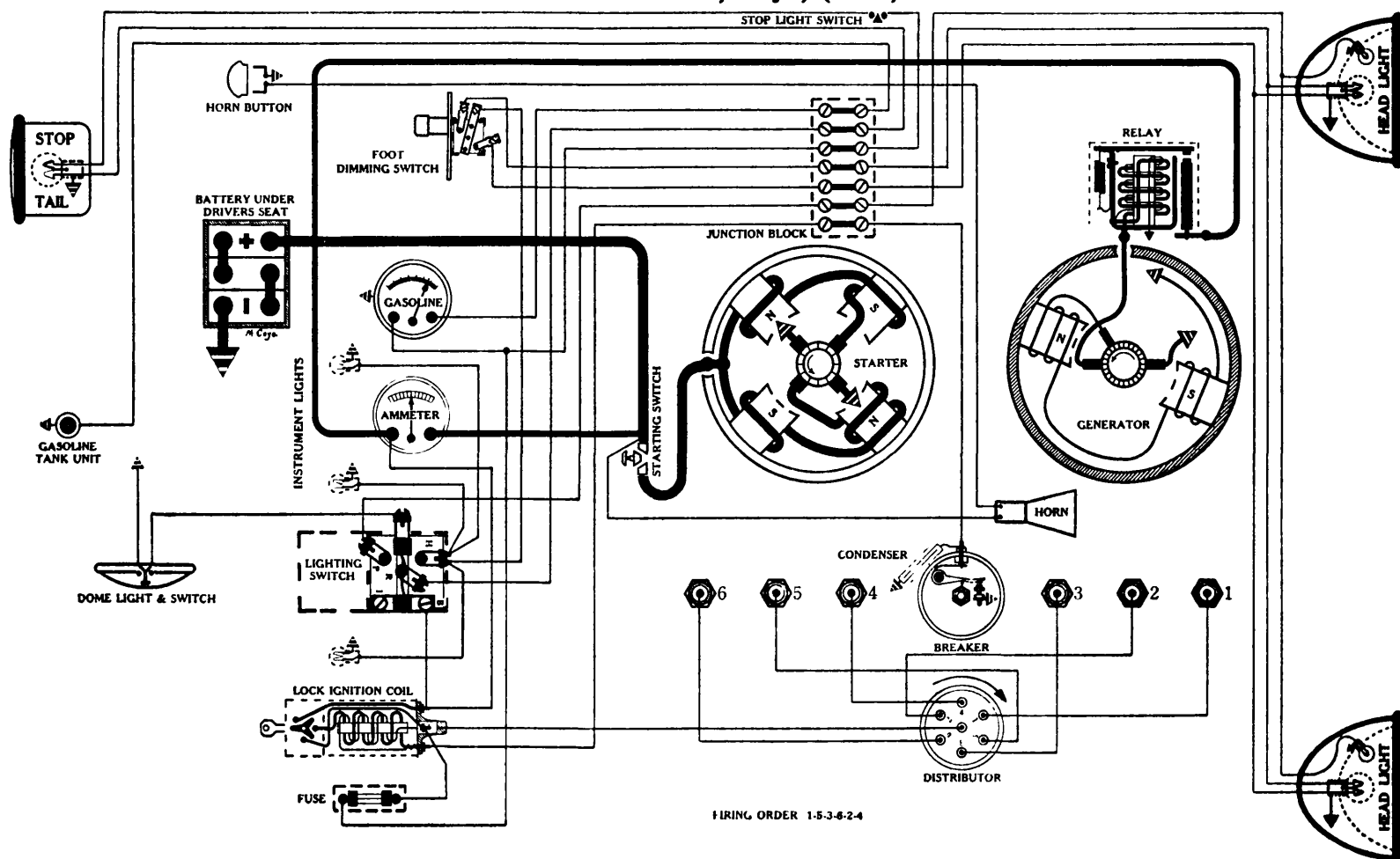
Foot Dimming Switch—Soreng-Manegold, No. A2100-A.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; AUX.—63; INSTRUMENT—63; STOP AND TAIL—1158.

CONTINENTAL

Mod 1 81 "Ac", 6 cyl., (1933)



BATTERY

National, H3-15-X, 6 volts. Negative Terminal Grounded

Starting Capacity—119 amps. for 20 minutes.

Lighting Capacity—5 amps. for 20 hours.

Box—Length, 10-7/16; width, 7 1/4; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4037

Connection to Engine—Bendix Drive.

Running Free—60 amps. at 6 volts, 4150 R.P.M.

Cranking Engine—160 to 170 amps. at 6 volts.

Lock Torque—17 pound-feet, 520 amps. at 3 volts.

Brush Spring Tension—44 to 48 oz. on each.

Starting Switch—Auto Lite, SW-4003.

Armature—Auto-Lite, MAB-2006.

IGNITION

Rotation, R. H., Top View
Auto Lite, IGB-4084
(Full Automatic Spark Advance)

Breaker—Contact separation .018 inch, or 26 cam degrees.

Contact Spring Tension—17 to 19 oz.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (AC type G-10); Gap .025 inch.

Firing Ord r—1-5-3-6-2-4.

Automatic Advance—27 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
550	Start	275	Start
730	4	365	2
900	8	450	4
1200	15	600	7 1/2
2000	20	1000	10
2700	24	1350	12
3200 (Max.)	27	1600	13 1/2

Lock Ignition Coil—Auto-Lite, IG-4310.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4330, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.3	13	1200	7.5
6	800	6.9	15	1400	7.7
10	1000	7.1	17	1900 (Max.)	8.

Motoring Freely—4 1/2 to 5 amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—4 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—10 to 13 oz. on each.

Armature—Auto-Lite, GAL-2141.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5670-AA.

Location—Behind instrument board. Operated by pull knob.

Fuses—Single 20 amp. (type 3A-20), mounted on switch back.

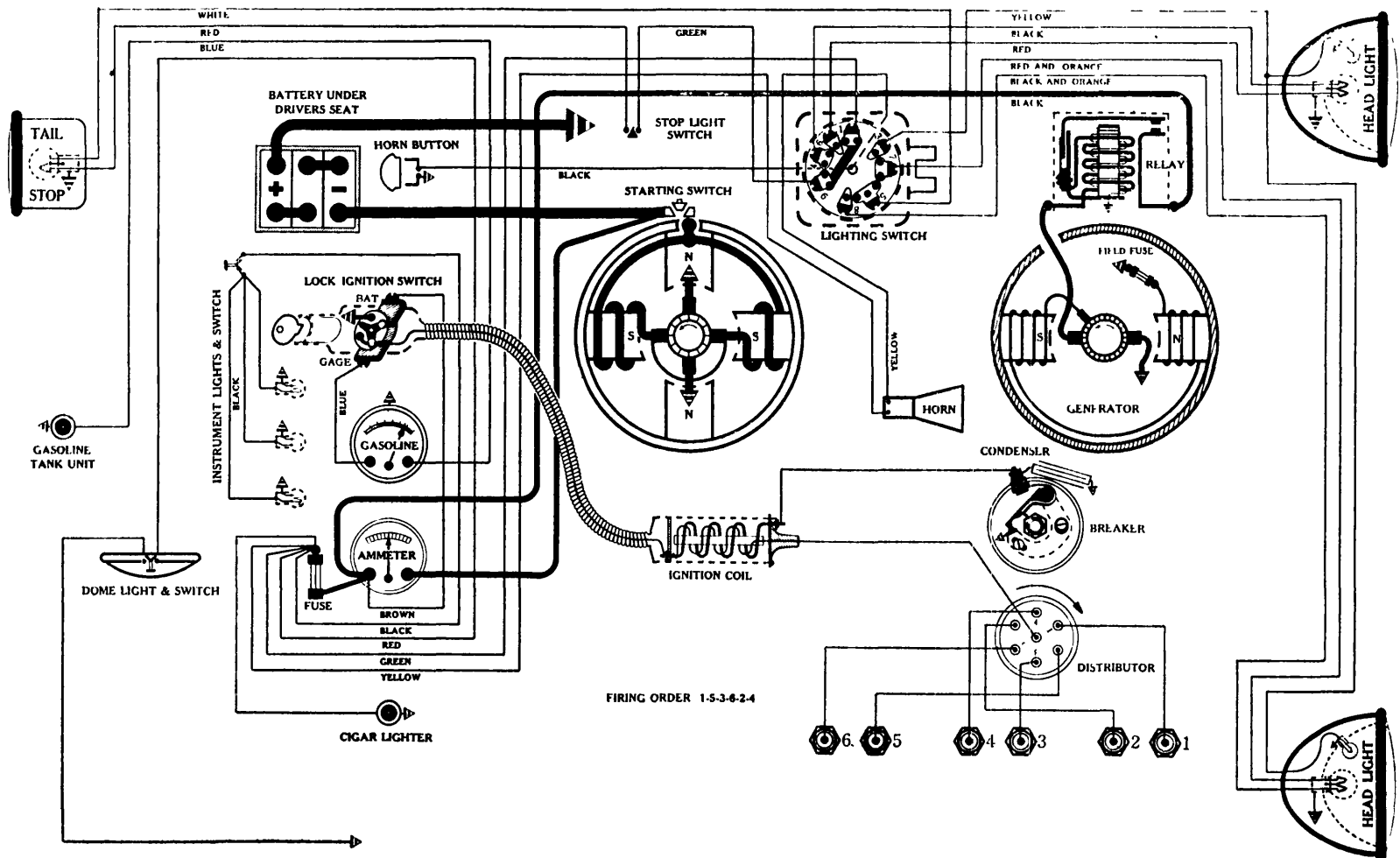
Foot Dimming Switch—Soreng-Manegold, No. A2100-A.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; AUX.—63; INSTRUMENT—63; STOP AND TAIL—1158.

DE SOTO

Model SD, 6 cyl., (Early 1933)



BATTERY

Willard, WT-1-15, 6 volts. Positive Terminal Grounded
(If radio equipped, Battery, Willard WS-2-15. For data see
De Soto SD Late 1933)
Starting Capacity—117 amps for 20 minutes.
Lighting Capacity—4.5 amps. for 20 hours.
Box—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 734-L

Connection to Engine—Mechanical Gear Shift in conjunction with
Delco Remy 1550 Vacuum Coincidental Starter Control.
Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—165 to 185 amps. at 4.2 volts.
Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each.
Armature—Delco-Remy, 1848389.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 622-C
(Full Automatic Spark Advance)

Breaker Contact separation .020 inch, or 25 cam degrees.
Contact Spring Tension—17 to 21 oz.

Timing—Remove inspection cover plate located on left side of flywheel housing, directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "DC" coincides with "Ign" pointer on timing indicator plate. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove the 1/8 inch pipe plug (located above No. 6 piston) and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12, or remove No. 1 spark plug and attach Gauge, using adapter No. 114 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .041 inch before T.D.C. (standard head) or .010 inch before T.D.C. (red head), as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-12), Standard Head; Gap .025 inch.

14-MM (AC type K-10), Red Head; Gap .025 inch.
Firing Order—1-5-3-6-2-4.

Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1260	4	630	2
1700	8	850	4
2150	12	1075	6
2600 (Max.)	16	1300	8

Coil and Lock Switch Assembly—Delco-Remy, 537-S.

GENERATORS

Rotation, L. H., Com. End
Delco-Remy 943-S or 937-E, (Belt Drive)
(For 937-E Data see Early 1933 Chrysler, Model CO)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	800	6.5	12	1250	7.5
4	900	6.8	16	1600	8.1
8	1050	7.1	17	2300 (Max.)	8.3

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 4 1/2 volts.

Field Test—3 1/2 amps. at 6 volts across field coils in series.

Field Fuse—5 amp. (type 7A-5).

NOTE:—943 S Generators above Serial No. 30,000 equipped with field fuse.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes —7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9454 (Special Five Position "Flex-Beam" Switch, not interchangeable with previous models).

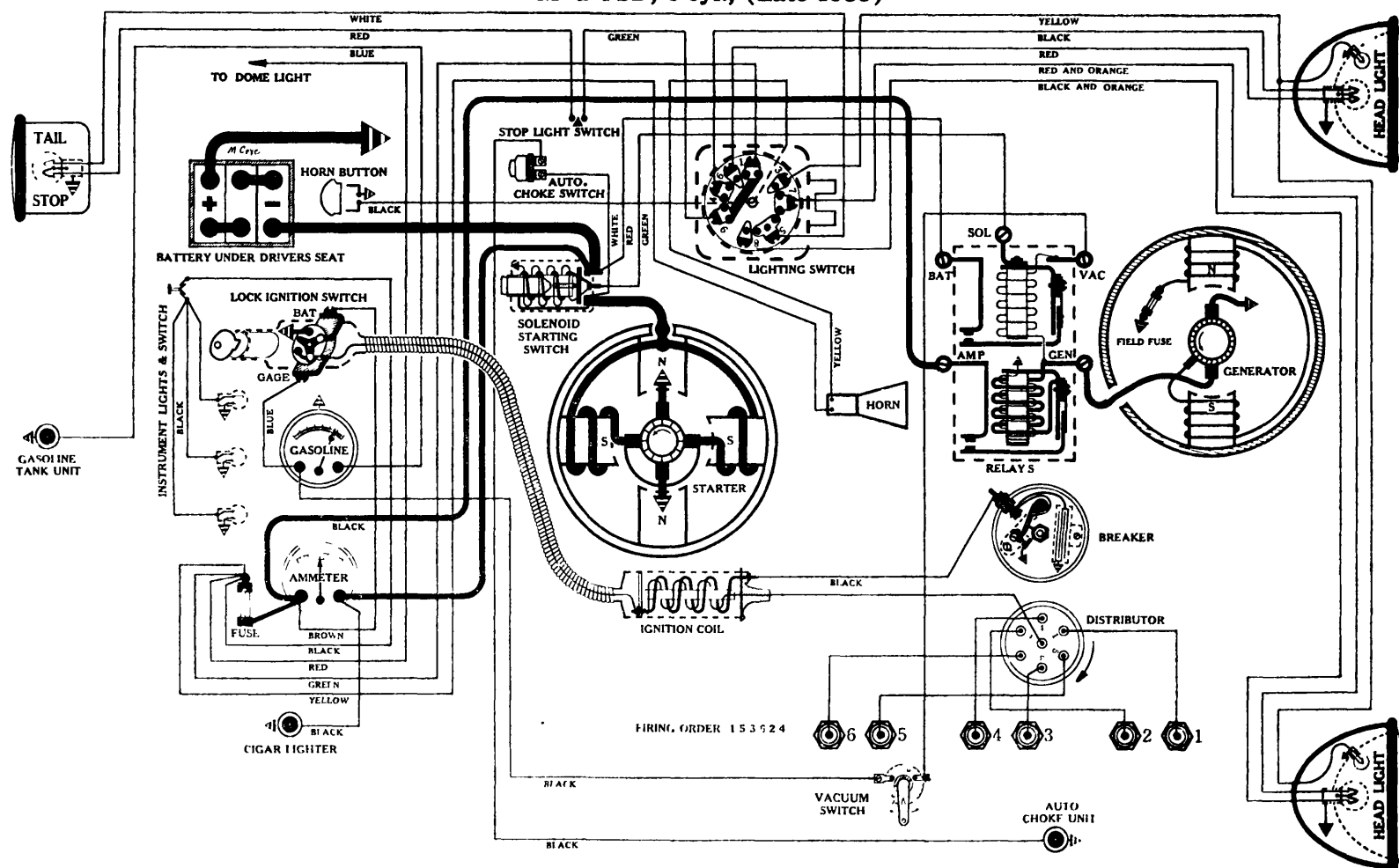
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20) mounted vertically beside ammeter, behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1000; AUX.—63; INSTRUMENT—63; DOME—87; STOP AND TAIL—1158.

DE SOTO

M d 1 SD, 6 cyl., (Late 1933)



BATTERY

Willard, WS 2-15, 6 volts. Positive Terminal Grounded

Starting Capacity—122 amps. for 20 minutes.

Lighting Capacity—5 amps. for 20 hours.

Box—Length, 10-5/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 734-R

Connection to Engine—Mechanical Gear Shift incorporating an over running clutch, actuated by a solenoid mounted under starting motor, and controlled by the foot accelerator, by means of a vacuum switch and auxiliary relay on generator.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—165 to 185 amps. at 4.2 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy Solenoid, 1504.

Vacuum Starting Control Switch—Delco Remy, 1585.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 644-J

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch, or 25 cam degrees.

Contact Spring Tension—17 to 21 oz.

Timing—Remove inspection cover plate located on left side of flywheel housing directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "DC" coincides with "DC" mark on timing indicator plate. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove the 1/8 inch pipe plug (located above No. 6 piston), and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12, or remove No. 1 spark plug, and attach Gauge, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C. (standard head), or .015 after T.D.C. (red head), as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-12), Standard Head; Gap .025 inch.

14-MM (AC type K-10), Red Head; Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—32 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Degrees Advance (on cam)
450	Start	225
500	2	250
660	8	330
840	15	420

1400	20	700	10
2200	26	1100	13
2800 (Max.)	32	1400	16

(oil and Lock Switch Assembly—Delco Remy, 537-Y.

GENERATORS

Rotation, L. H., Com. End

Delco-Remy 937-D or 937 F, (Belt Drive)

(For 937-F Data see Late 1933 Chrysler, Model CO).

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volt.
0	775	6.5	15	1340	7.8
5	900	6.8	20	1840	8.4
10	1100	7.2	21	2400 (Max.)	8.1

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 5.5 volts.

Field Test—3 1/2 amps. at 6 volts across field coils in series.

Field Fuse—5 amp. (Type 7A-5).

NOTE:—937-D Generators above Serial No. 12,000 equipped with field fuse.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAYS

Delco-Remy, 264-D

(Combination Cut-Out Relay and Starter Remote Control Relay)

Cut-out Relay:

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

Remote Control Relay:

Closes—4.3 to 4.7 volts.

Opens—At 2 volts or less.

Contact Gap—.050 to .055 inch.

Core Gap—.007 to .009 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9454 (Special Five Position "Flex-Beam" Switch, not interchangeable with previous models).

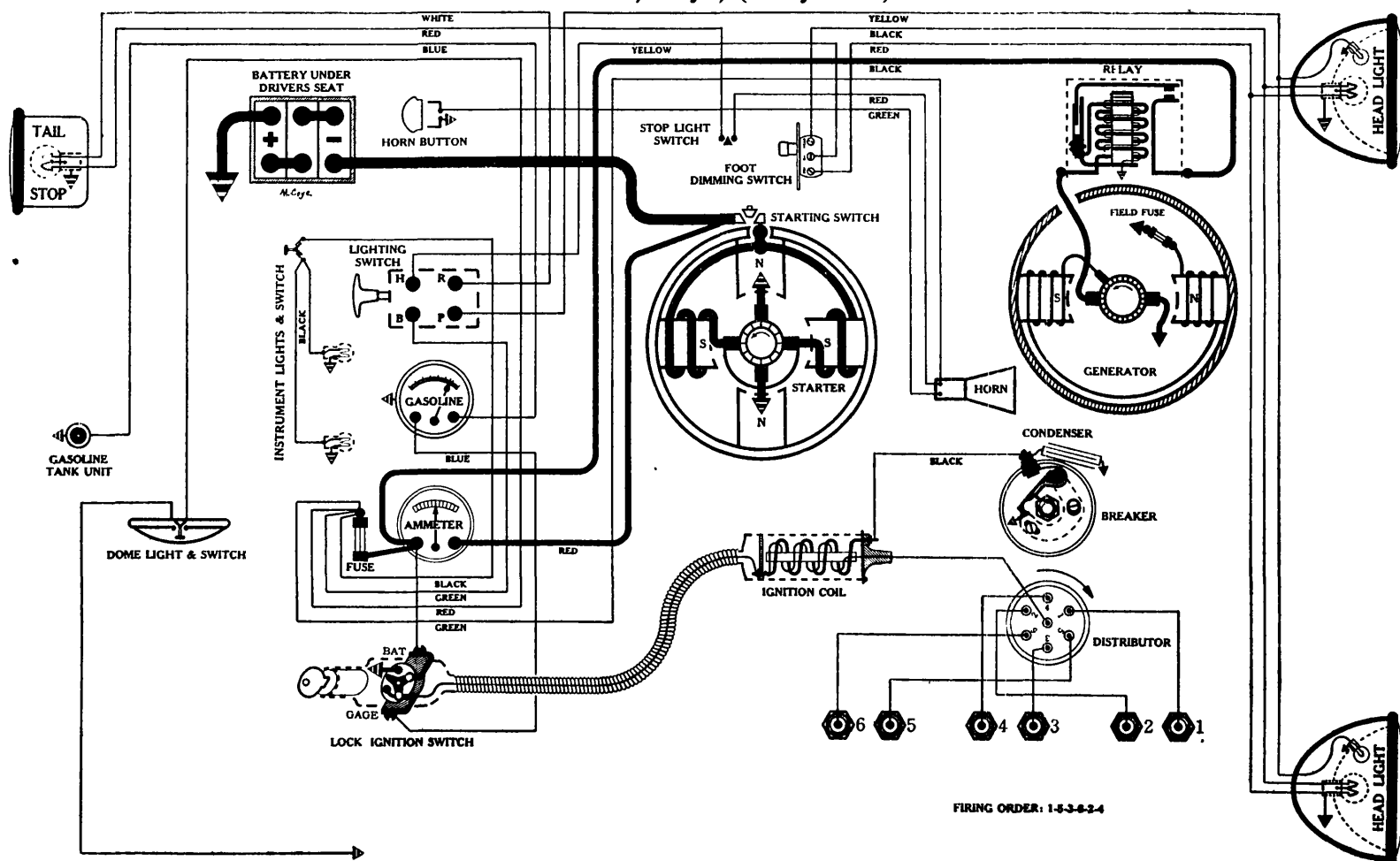
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20) mounted vertically beside ammeter, behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1000; AUX.—63; INSTRUMENT—63; DOME—87; STOP AND TAIL—1158.

DODGE

Model DP, 6 cyl., (Early 1933)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded
(If radio equipped, Battery, Willard, WT-1-15. For data see Dodge DP Late 1933)
Starting Capacity—105 amps. for 20 minutes.
Lighting Capacity—4.3 amps. for 20 hours.
Box—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 734-H

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—165 to 180 amps. at 4.2 volts.
Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each.
Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 622-H
(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch, or 25 cam degrees.
Contact Spring Tension—17 to 21 oz.

Timing—Remove inspection cover plate located on left side of flywheel housing, directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when mark on flywheel is opposite "Ign. 10°" pointer on timing indicator plate. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove the 1/8 inch pipe plug (located above No. 6 piston), and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12, or remove No. 1 spark plug and attach Gauge, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .042 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-12); Gap .025 inch.
Firing Order—1-5-3-6-2-4.

Automatic Advance—18 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1500	8	750	4
2200	16	1100	8
2400 (Max.)	18	1200	9

Coil and Lock Switch Assembly—537-V.

GENERATORS

Rotation, L. H., Com. End
Delco-Remy, 943 S or 937-E, (Belt Drive)

(For 937-E Data see Late 1933 Dodge, Model DP)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	800	6.5	12	1250	7.5
4	900	6.8	16	1600	8.1
8	1050	7.1	17	2300 (Max.)	8.3

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 4½ volts.

Field Test—3½ amps. at 6 volts across field coils in series.

Field Fuse—5 amp. (Type 7A-5).

NOTE—943 S Generator above Serial No. 30,000 equipped with field fuse.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Dodge, No. 393358.

Location—Behind instrument board. Operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20) mounted beside ammeter, behind instrument board.

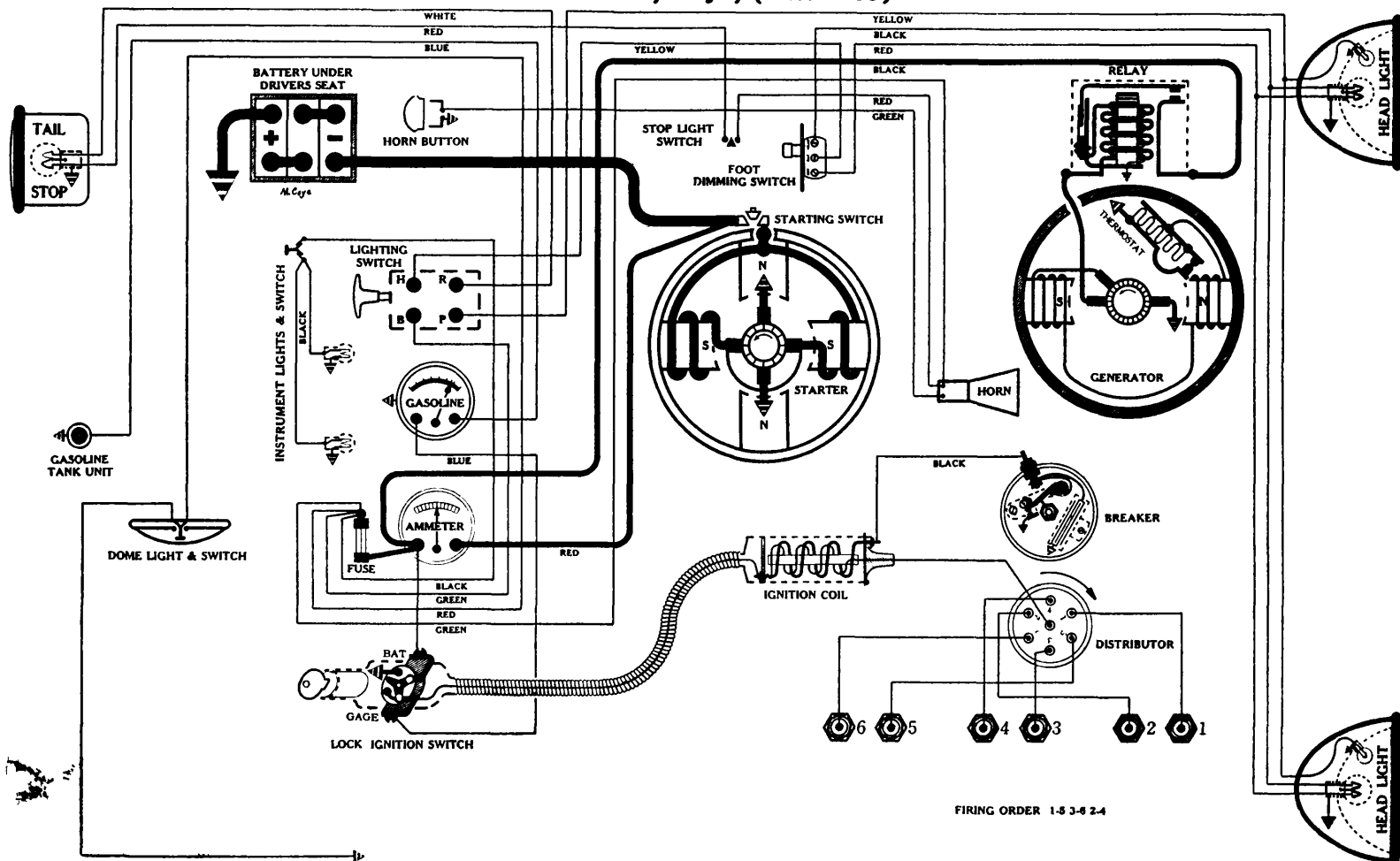
Foot Dimming Switch—Delco-Remy, 465-W.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamp Table—See Lamp Table, Sec. AA. HEAD—1000; AUX.—63; INSTRUMENT—63; DOME—87; STOP AND TAIL—1158.

DODGE

Mod 1 DP, 6 cyl., (Late 1933)



BATTERY

Willard, WT-1-15, 6 volts. Positive Terminal Grounded

Starting Capacity—117 amps, for 20 minutes.

Lighting Capacity—4.5 amps. for 20 hours.

Box—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 734-H

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—165 to 180 amps. at 4.2 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco Remy, 644-K
(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch, or 25 cam degrees.

Contact Spring Tension—17 to 21 oz.

Timing—Remove inspection cover plate, located on left side of flywheel housing, directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "DC" coincides with "Ign" mark on timing indicator plate. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove the 1/8 inch pipe plug (located above No. 6 piston) and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12, or remove No. 1 spark plug and attach Gauge, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. Continue to turn until piston starts down on power stroke. Stop when .004 after T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-12); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—32 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	Start	200	Start
500	4	250	2
600	8	300	4
800	15	400	7 1/2
1300	20	650	10
2000	28	1000	14
2400 (Max.)	32	1200	16

Coil and Lock Switch Assembly—Delco-Remy, 537-V.

GENERATORS

Rotation, L. H., Com. End

Delco-Remy, 937-E or 943-S, (Belt Drive)

(For 943-S Data see Early 1933 Dodge, Model DP)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	15	1300	7.8
5	950	6.8	20	1600	8.4
10	1100	7.2	24	2400 (Max.)	8.5

NOTE—Thermostat opens about 165° F., reducing charging rate approx 30 to 40%.

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 5.5 volts.

Field Test—3 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Dodge, No. 393358.

Location—Behind instrument board. Operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20) mounted beside ammeter, behind instrument board.

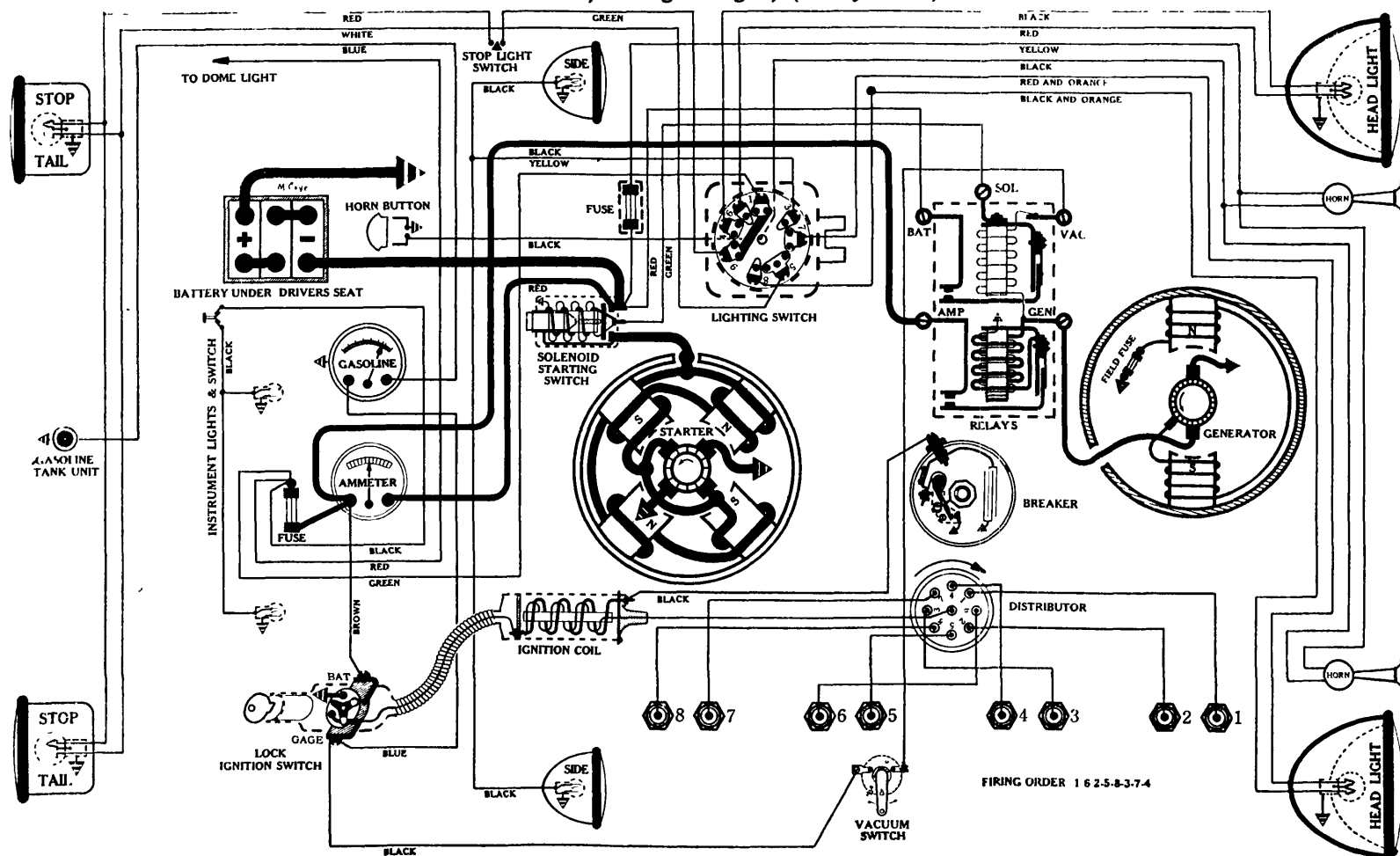
Foot Dimming Switch—Delco-Remy, 465-W.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamp Table—See Lamp Table, Sec. AA. HEAD—1000; AUX.—63; INSTRUMENT—63; DOME—87; STOP AND TAIL—1158.

DODGE

Model DO, Straight Eight, (Early 1933)



BATTERY

Willard, WS 4-17, 6 volts. Positive Terminal Grounded
Starting Capacity—140 amps. for 20 minutes.
Lighting Capacity—5.7 amps. for 20 hours.
Box—Length, 11-11/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 725-Z

(Connection to Engine—Mechanical Gear Shift incorporating an over-running clutch, actuated by a solenoid mounted under starting motor, and controlled by the foot accelerator, by means of a vacuum switch and auxiliary relay on generator.

Running Free—60 amps. at 5 volt, 6000 R.P.M.

Cranking Engine—160 to 180 amps. at 4 volts.

Lock Torque—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy Solenoid, 1504.

Vacuum Starting Control Switch—Delco-Remy, 1585.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 661-D

(Full Automatic Spark Advance)

Breaker—Contact separation .016 inch, or 17 cam degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Remove inspection cover plate located on left side of flywheel housing directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when mark on flywheel is opposite "Ign. 10°" pointer on timing indicator plate. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove the 1/2 inch pipe plug (located above No. 8 piston), and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12, or remove No. 1 spark plug, and attach Gauge, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 position is coming up on compression stroke. Stop when .040 inch before T.D.C. as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-12); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—17 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Degrees Advance (on cam)
600	Start	Start
800	2	1
1400	8	4
1720	12	6
2200 (Max.)	17	8 1/2

Coil and Lock Switch Assembly—Delco-Remy, 537-Y.

GENERATORS

Rotation, L. H., Com. End

Delco-Remy 937-D or 937-F, (Belt Drive)

(For 937-F Data see Late 1933 Dodge, Model DO)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	775	6.5	15	1340	7.8
5	900	6.8	20	1840	8.4
10	1100	7.2	21	2400 (Max.)	8.4

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 5.5 volts.

Field Test—3 1/2 amps. at 6 volts across field coils in series.

Field Fuse—5 amp. (Type 7A-5).

NOTE—937-D Generators above Serial No. 12,000 equipped with field fuse.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAYS

Delco-Remy, 264-D

(Combination Cut-Out Relay and Starter Remote Control Relay)

Cut-out Relay:

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

Remote Control Relay:

Closes—4.3 to 4.7 volts.

Opens—At 2 volts or less.

Contact Gap—.050 to .055 inch.

Core Gap—.007 to .009 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9454 (Special Five Position "Tri-Beam" Switch, not interchangeable with previous models).

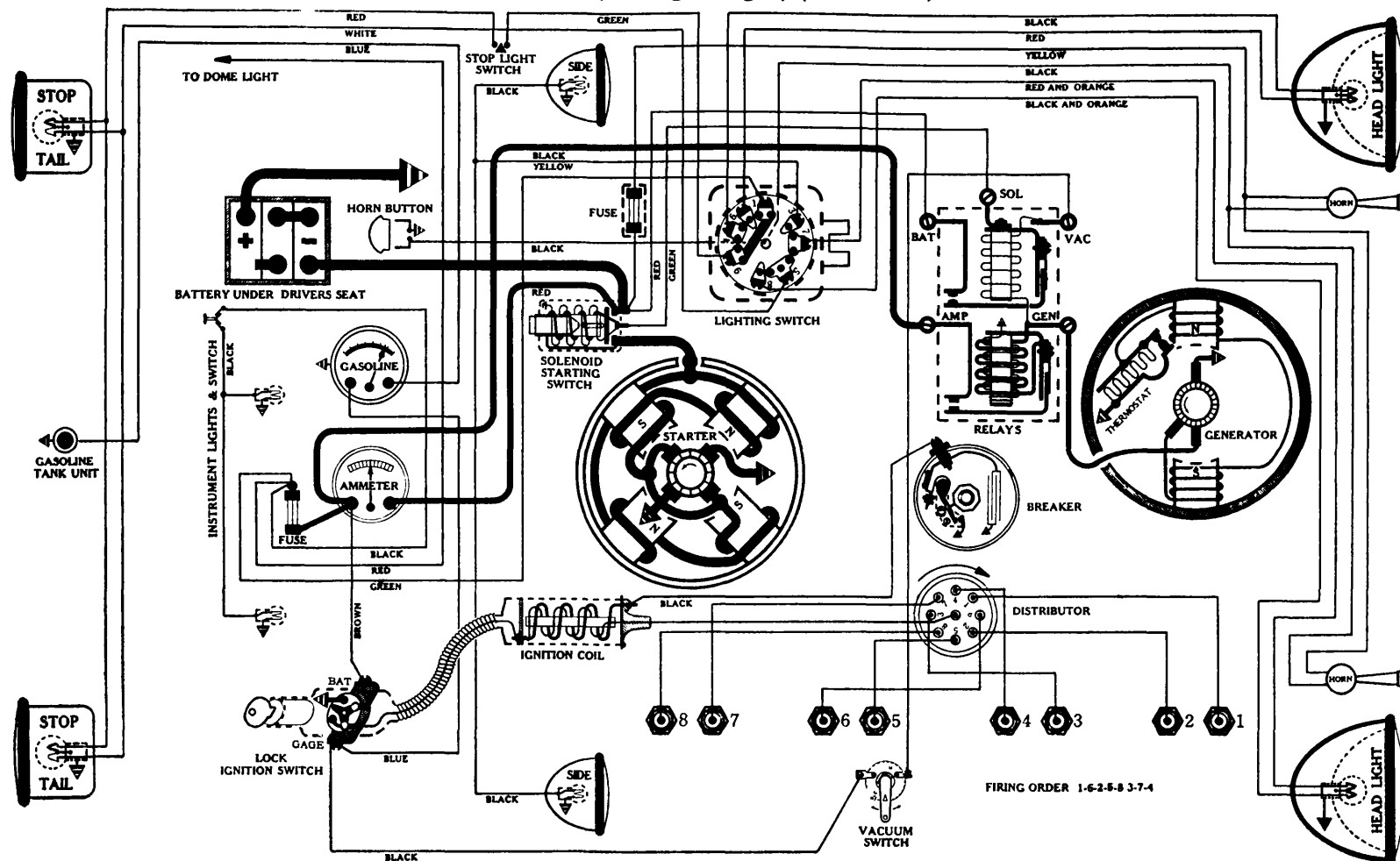
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Lighting Circuit, Single 20 amp. fuse (type 3A-20) mounted near ammeter, behind instrument board. Horn Circuit, Single 20 amp. fuse (type 3A-20) in tubular holder on wire attached to solenoid terminal.

Lamps—See Lamp Table, Sec. AA. HEAD—1000; SIDE—63; INSTRUMENT—63; DOME—87; STOP AND TAIL—1158.

DODGE

Model DO, Straight Eight, (Lat 1933)



BATTERY

Willard, WS-4-17, 6 volts. Positive Terminal Grounded
Starting Capacity—140 amps. for 20 minutes.
Lighting Capacity—5.7 amps. for 20 hours.
Box—Length, 11-11/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 725-Z

Connection to Engine—Mechanical Gear Shift incorporating an over-running clutch, actuated by a solenoid mounted under starting motor, and controlled by the foot accelerator, by means of a vacuum switch and auxiliary relay on generator.

Running Free—60 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—160 to 180 amps. at 4 volts.

Lock Torque—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy Solenoid, 1504.

Vacuum Starting Control Switch—Delco-Remy, 1585.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 661-S

(Full Automatic Spark Advance)

Breaker—Contact separation .016 inch, or 17 cam degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Remove inspection cover plate located on left side of flywheel housing directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "DC" coincides with "DC" mark on timing indicator plate. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove the 1/2 inch pipe plug (located above No. 8 piston), and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12, or remove No. 1 spark plug, and attach Gauge, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-12); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—26 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
450	Start	225	Start
500	2	250	1
660	4	330	2
840	15	420	7 1/2
1400	20	700	10
1900	24	950	12
2200 (Max.)	26	1100	13

Coil and Lock Switch Assembly—Delco-Remy, 587-Y.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 937-F

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	15	1300	7.8
5	950	6.8	20	1600	8.4
10	1100	7.2	24	2400 (Max.)	8.5

NOTE:—Thermostat opens about 165° F., reducing charging rate approx 30 to 40%.

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 5.5 volts.

Field Test—3 1/2 amps. at 6 volts, across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAYS

Delco-Remy, 264-D

(Combination Cut-Out Relay and Starter Remote Control Relay)

Cut-out Relay:

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

Remote Control Relay:

Closes—4.3 to 4.7 volts.

Opens—At 2 volts or less.

Contact Gap—.050 to .055 inch.

Core Gap—.007 to .009 inch, contacts closed.

LIGHTING

Switch, Clum, No. 9454 (Special Five Position "Tri-Beam" Switch, not interchangeable with previous models).

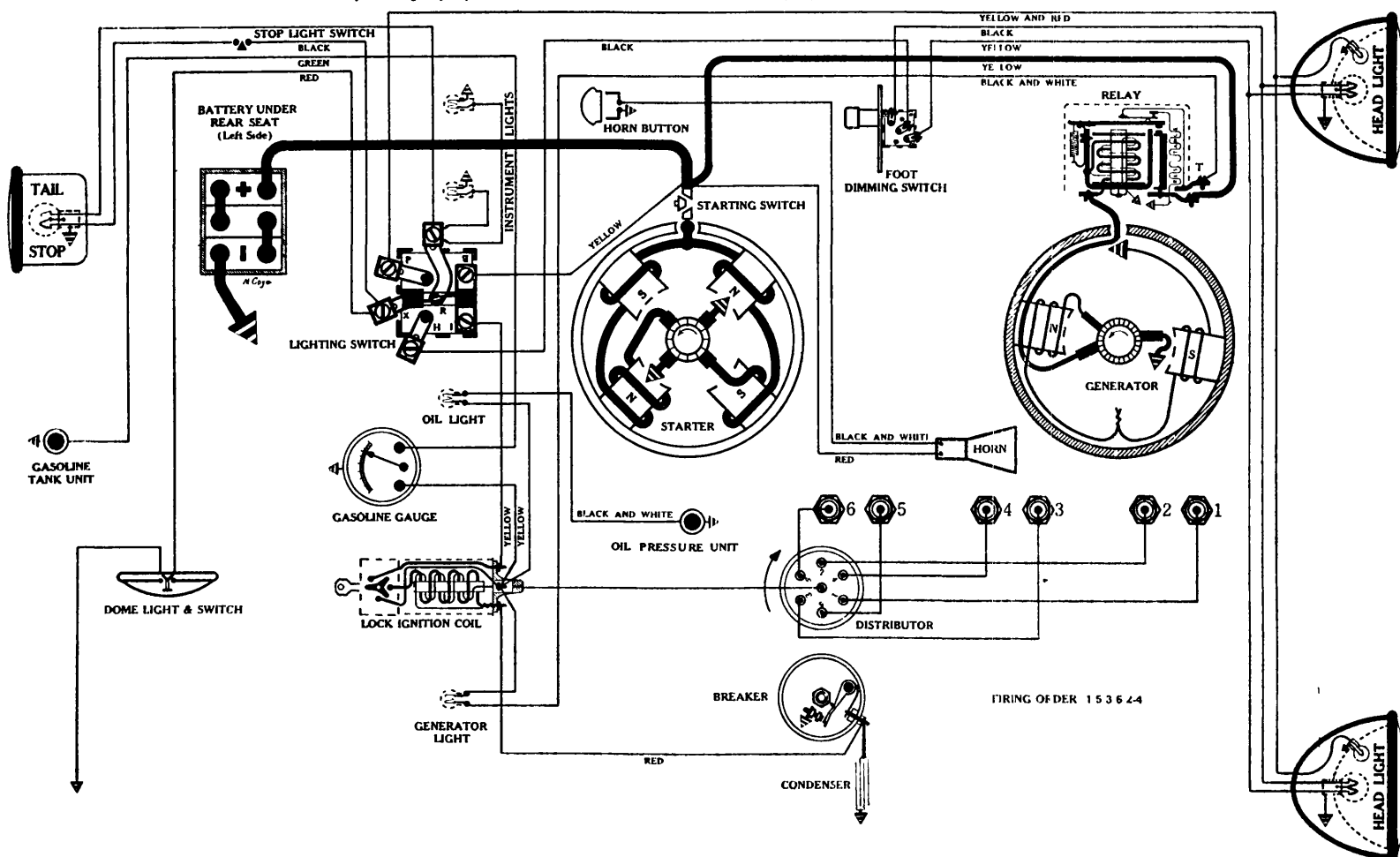
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Lighting Circuit, Single 20 amp. fuse (type 3A-20) mounted near ammeter, behind instrument board. Horn Circuit, Single 20 amp. fuse (type 3A-20) in tubular holder on wire attached to solenoid terminal.

Lamps—See Lamp Table, Sec. AA. HEAD—1000; SIDE—68; Instrument—63; DOME—87; STOP AND TAIL—1153.

ESSEX - TERRAPLANE

Model K, 6 cyl., (Late 1932-Narrow Tread), (Early 1933-Standard Tread)



BATTERY

National, H3-13-X, 6 volts. Negative Terminal Grounded
 Starting Capacity—102 amps. for 20 minutes.
 Lighting Capacity—4.3 amps. for 20 hours.
 Box—Length, 9 $\frac{1}{8}$; width, 7 $\frac{1}{8}$; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAJ-4028

Connection to Engine—Bendix Drive, Type LCD11X-10.
 Running Free—67 amps. at 5.5 volts, 4100 R.P.M.
 Cranking Engine—165 amps. at 4.9 volts, 230 R.P.M.
 Lock Torque—12 $\frac{1}{2}$ pound-feet, 575 amps., 3 volts.
 Brush Spring Tension—36 to 40 oz. on each.
 Starting Switch—Auto-Lite, MU-2208-S, mounted on starter.
 Switch should not close with less than 7 $\frac{1}{2}$ lbs. pull, applied at right angles to hole in end of lever.
 Armature—Auto-Lite, MAJ-2055.

IGNITION

Rotation, R. H., Top View
 Auto-Lite, IGB-4074-A
 (Full Automatic Spark Advance)

Breaker—Contact separation .020 inch, or 26 cam degrees.
 Contact Spring Tension—17 to 19 oz.
 Timing—With No. 1 piston on compression stroke, slowly turn engine (using wrench on starter armature extension) until flywheel mark "U.D.C. 1-6" is opposite pointer cast in flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
 Timing with MOTOR GAUGE—Remove No. 1 Spark Plug, and attach MOTOR GAUGE, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston reaches exact T.D.C. (compression stroke), as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
 Spark Plugs—14-MM (Champion type J-7); Gap .020 to .025 inch.
 Firing Order—1-5-3-6-2-4.
 Automatic Advance—30 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1900	10	950	5
2700	18	1350	9
4000 (Max.)	30	2000	15

 Lock Ignition Coil—Auto-Lite, IG-4308.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAM-4402, (Belt Drive)

(Cut out Assembly mounted on Generator)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.4	12	1320	7.4
4	880	6.8	16	1860	7.8
8	1060	7.1	17	2400 (Max.)	8.

Motoring Freely—4 to 4 $\frac{1}{2}$ amps. at 6 volts.
 Max. Stall Current—23 amps. at 5.9 volts.
 Field Test—4 $\frac{1}{2}$ amps. at 6 volts across field coils in series.
 Brush Spring Tension—16 to 20 oz. on main; 20 to 24 oz. on third.
 Armature—Auto Lite, GAM-2055.
 Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CBA 4002 (Mounted on Generator)

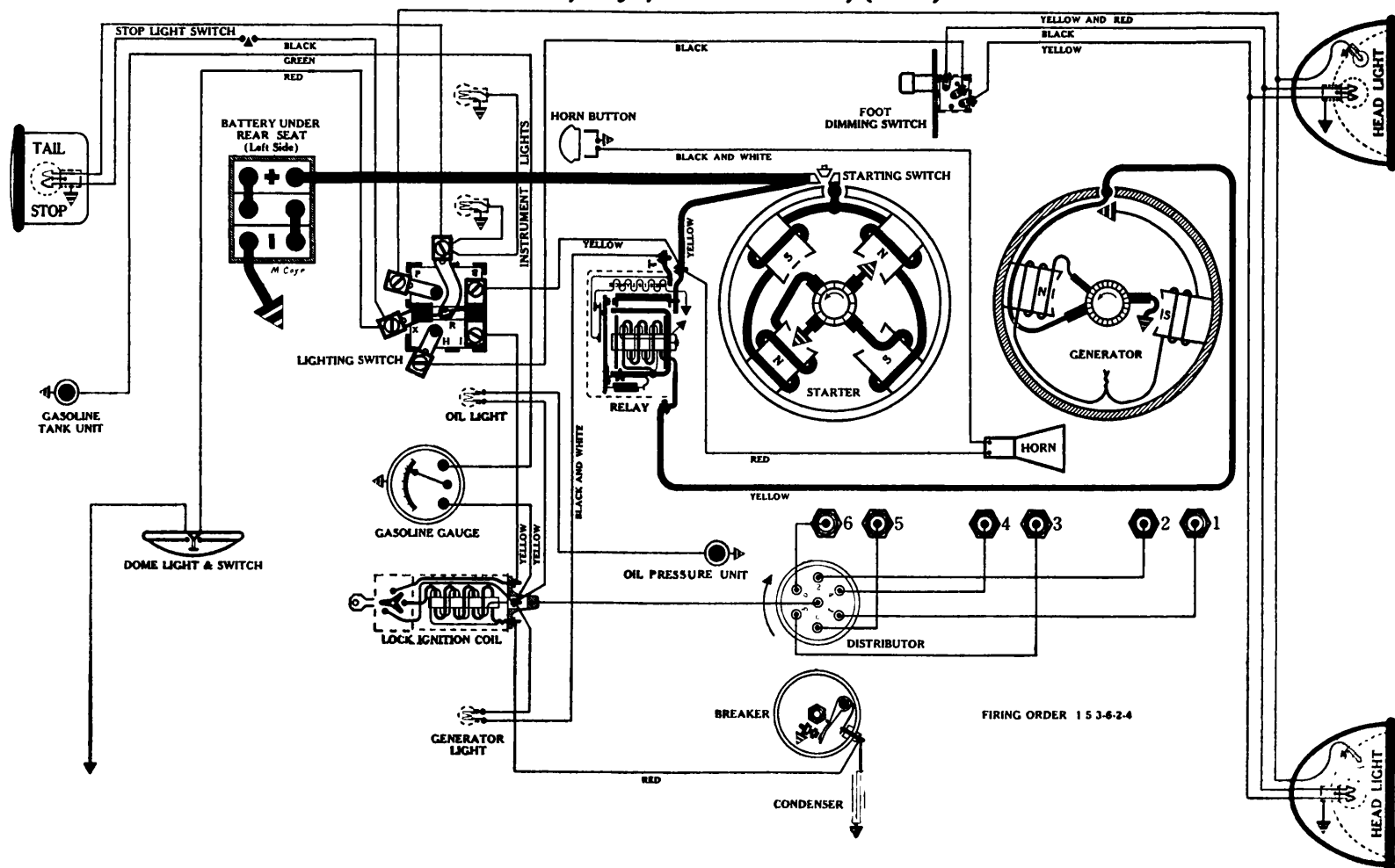
NOTE—This is a new type Cut-out, designed for use on cars with a generator charging "Tell-Tale" light, instead of the conventional ammeter. This unit has a third terminal stamped "T", which is grounded thru an extra set of points, and a resistance wire, when the regular cut out points are open.
 Closes—7 to 7 $\frac{1}{2}$ volts.
 Opens— $\frac{1}{2}$ to 2 $\frac{1}{2}$ amps. discharge.
 Contact Gap—.025 to .035 inch.
 Core Gap—.010 to .012 inch, contacts closed.
 "Tell-Tale" Circuit Test—1 amp. at 6 volts between terminal "T" and cut-out frame (ground).

LIGHTING

Switch—Soreng-Manegold, No. B5670-A.
 Location—Behind instrument board, operated by pull knob.
 Fuses—Single 20 amp. fuse (type 3A-20), mounted on lighting switch.
 Foot Dimming Switch—Soreng-Manegold, C2100-A.
 Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.
 Lamps—See Lamp Table, Sec. AA. HEAD—1110; PARKING (AUX. or FENDER)—63; DOME—87; INSTRUMENT—63; STOP AND TAIL—1158; GENERATOR AND OIL TELL-TALE—64. IMPORTANT! This is a double contact bulb.

ESSEX-TERRAPLANE

Mod 1 K, 6 yl., Standard Tr ad, (1933)



BATTERY

National, H3-13-X, 6 volts. Negative Terminal Grounded
 Starting Capacity—102 amps. for 20 minutes.
 Lighting Capacity—4.3 amps. for 20 hours.
 Box—Length, 9½; width, 7½; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAJ-4031

Connection to Engine—Bendix Drive, Type A-1588.
 Running Free—67 amps. at 5.5 volts, 4100 R.P.M.
 Cranking Engine—165 amps. at 4.9 volts, 230 R.P.M.
 Lock Torque—12½ pound-feet, 575 amps., 3 volts.
 Brush Spring Tension—36 to 40 oz. on each.
 Starting Switch—Auto-Lite, MU-2208-S, mounted on starter.
 Switch should not close with less than 7½ lbs. pull, applied at right angles to hole in end of lever.
 Armature—Auto-Lite, MAJ-2055.

IGNITION

Rotation, R. H., Top View
 Auto-Lite, IGB-4074-A

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch, or 26 cam degrees.
 Contact Spring Tension—17 to 19 oz.

Timing—With No. 1 piston on compression stroke, slowly turn engine (using wrench on starter armature extension) until flywheel mark "U.D.C. 1-6" is opposite pointer cast in flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 Spark Plug, and attach MOTOR GAUGE, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston reaches exact T.D.C. (compression stroke), as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (Champion type J-7); Gap .020 to .025 inch.
 Firing Order—1-5-3-6-2-4.

Automatic Advance—30 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1900	10	950	5
2700	18	1350	9
4000 (Max.)	30	2000	15

Lock Ignition Coil—Auto-Lite, IG-4308.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAM-4503, (Belt Drive)
 (Cut-out Assembly mounted on Dash)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.4	12	1320	7.4
4	880	6.8	16	1860	7.8
8	1060	7.1	17	2400 (Max.)	8.

Motoring Freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—23 amps. at 5.9 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 20 oz. on main; 20 to 24 oz. on third.

Armature—Auto-Lite, GAM-2055.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CBA-4002 (Mounted on Dash)

NOTE.—This is a new type Cut-out, designed for use on cars with a generator charging "Tell-Tale" light, instead of the conventional ammeter. This unit has a third terminal stamped "T", which is grounded thru an extra set of points, and a resistance wire, when the regular cut out points are open.

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

"Tell-Tale" Circuit Test—1 amp. at 6 volts between terminal "T" and cut-out frame (ground).

LIGHTING

Switch—Soreng-Manegold, No. B5670-A.

Location—Behind instrument board, operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on lighting switch.

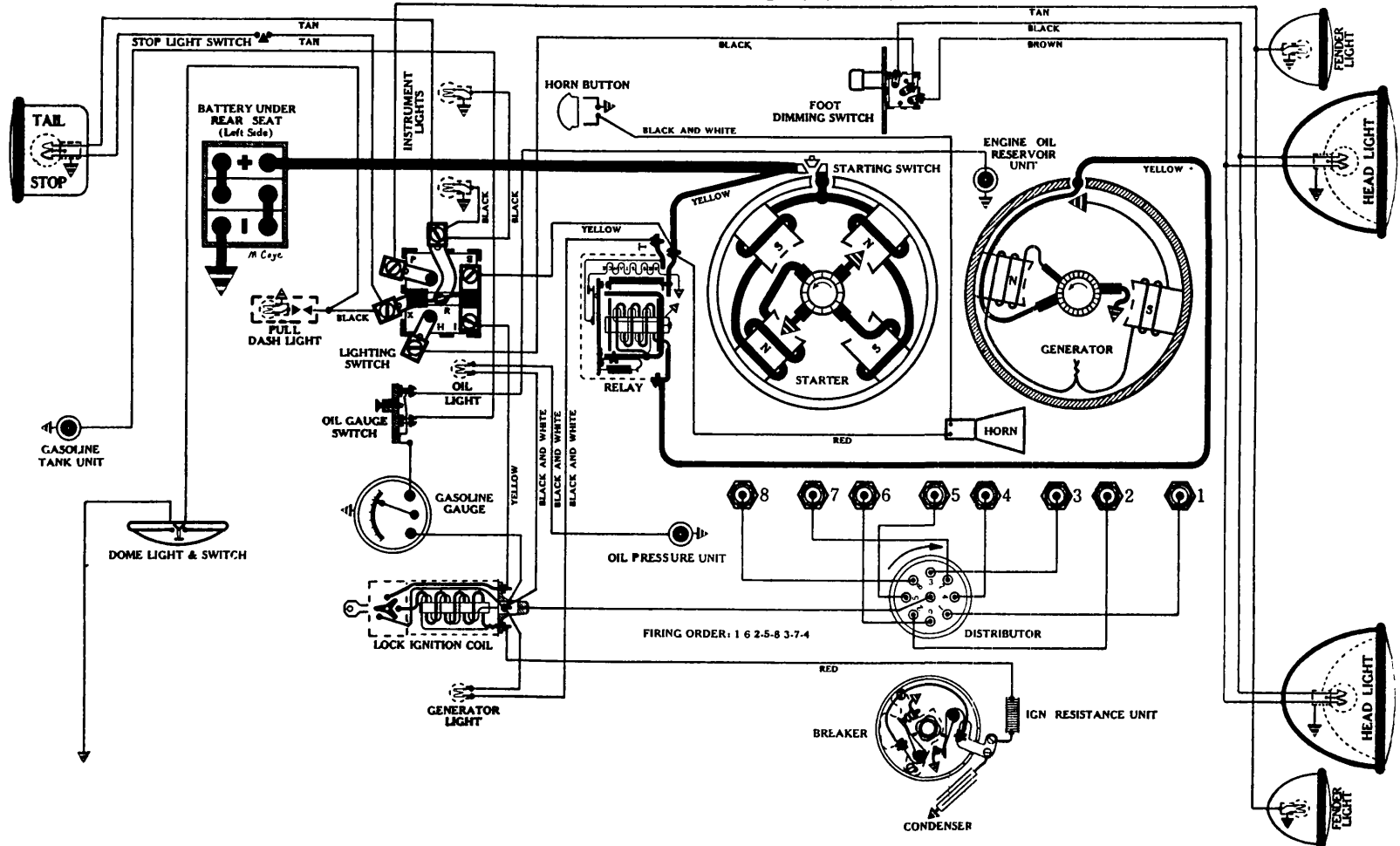
Foot Dimming Switch—Soreng-Manegold, C2100-A.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; PARKING (AUX. or FENDER)—63; DOME—87; INSTRUMENT—63; STOP AND TAIL—1158; GENERATOR AND OIL TELL-TALE—64. IMPORTANT! This is a double contact bulb.

ESSEX-TERRAPLANE

Model KT, Straight Eight, (1933)



BATTERY

Exide, 3-VXA-15-1, 6 volts. Negative Terminal Grounded
Starting Capacity—122 amps. for 20 minutes.
Lighting Capacity—5.1 amps. for 20 hours.
Box—Length, 10-9/32; width, 7; height, 9-5/32 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4051

Connection to Engine—Bendix Drive, Type LCD11X-10.

Running Free—60 amps. at 5.5 volts, 3700 R.P.M.

Cranking Engine—165 to 180 amps. at 5.1 volts.

Lock Torque—15 pound-feet, 575 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (new brushes).

Starting Switch—Auto-Lite, MU-2208-S, mounted on starter.

Switch should not close with less than 7½ lbs. pull applied at right angles to hole in end of lever.

Armature—Auto-Lite, MAB-2101.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGH-4024-A

(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch, or 56 cam degrees.

Contact Spring Tension—17 to 19 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—On engines using straight run gasoline; with No. 1 piston on T.D.C., power stroke, flywheel mark "DC-1-8" opposite pointer, rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open. On engines using Ethyl gasoline, set stationary breaker points to open when flywheel mark "DC 1-8" is ¼ inches below pointer, as No. 1 piston is coming up on compression stroke.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. On engines using straight run gasoline stop when piston reaches exact T.D.C., as indicated on Gauge. On engines using Ethyl gasoline, stop when .021 inch before T.D.C. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—14-MM (Champion type J-7); Gap .020 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—37 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1100	4	550	2
1900	12	950	6
3000	20	1500	10
4000 (Max.)	37	2000	18½

Lock Ignition Coil—Auto-Lite, CE-4303.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAM-4503, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.4	12	1320	7.4
4	880	6.8	16	1860	7.8
8	1060	7.1	17	2400 (Max.)	8.

Motoring Freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—23 amps. at 5.9 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 20 oz. on main; 20 to 24 oz. on third.

Armature—Auto-Lite, GAM-2055.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CBA-4002

NOTE—This is a new type Cut out, designed for use on cars with a generator charging "Tell Tale" light, instead of the conventional ammeter. This unit has a third terminal stamped "T", which is grounded thru an extra set of points, and a resistance wire, when the regular cut out points are open.

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

"Tell-Tale" Circuit Test—1 amp. at 6 volts between terminal "T" and cut-out frame (ground).

LIGHTING

Switch—Soreng-Manegold, No. B5670-A.

Location—Behind instrument board, operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on lighting switch.

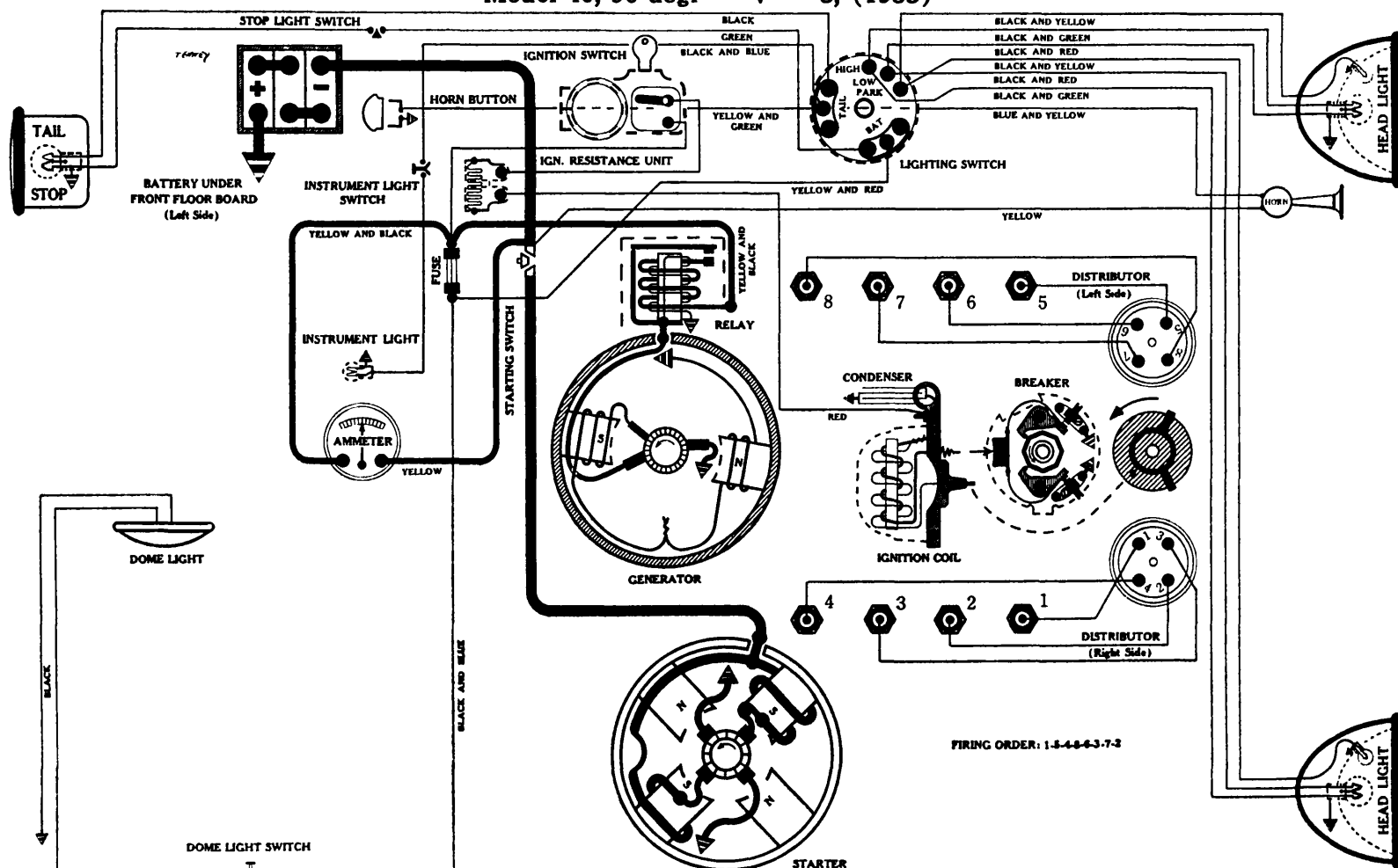
Foot Dimming Switch—Soreng-Manegold, C2100-A.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; FENDER—63; DOME—87; INSTRUMENT—63; STOP AND TAIL—1158; GENERATOR AND OIL TELL-TALE—64. IMPORTANT! This is a double contact bulb.

FORD

Model 40, 90 deg "V" 8, (1933)



BATTERY

Ford, 40-10655, 6 volts. Positive Terminal Grounded

Starting Capacity—114 amps. for 20 minutes.

Lighting Capacity—4.8 amps. for 20 hours.

Box—Length, 10¹/₂; width, 7¹/₄; height, 7¹/₂ inches.

STARTER

Rotation, L. H., Com. End

Ford, Type 40-11002

Connection to Engine—Bendix Drive, Type L11FX-10.

Running Free—35 to 40 amps. at 6 volts, 3960 R.P.M.

Cranking Engine—210 to 225 amps. at 4.3 volts.

Lock Torque—12 pound-feet, 500 amps. at 3 volts.

Brush Spring Tension—32 to 36 oz. on each.

Starting Switch—Ford, 18-11450.

Armature—Ford 18-11005.

IGNITION

Rotation, L. H., Viewed from Front

Special Ford, employing Mallory Breaker Principle

Full Automatic Spark Advance in conjunction with Vacuum Operated Governor Brake

Breakers—Contact separation .012 inch.

NOTE:—When both sets of breaker points are properly adjusted the primary circuit will be interrupted thru 8 degrees of distributor shaft rotation.

Contact Spring Tension—10 to 12 oz. on each.

Timing—Construction of ignition drive assembly makes it impossible to attach unit to engine other than in correct position. Provision is made for a slight variation in spark timing by moving small 3/16 inch slotted cap screw (found on right side of ignition housing between mounting flange and right distributor cap) up, to increase spark advance, and down to retard. With screw in center of slot engine will have a spark advance of between 4 and 5 flywheel degrees which, theoretically, is the correct timing position.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .008 inch before T.D.C., as indicated on Gauge. With rotor segment under No. 1 Dist. Cap Terminal (right side), right hand breaker point should just open.

Spark Plugs—18-MM (Champion type C-7); Gap .025 inch.

Firing Order—1-5-4-8-6-3-7-2.

Automatic Advance—22 degrees (on Flywheel).

Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance
(on flywheel) (on cam)

(Tests to be made with Vacuum Brake applied)

900	Start	450	Start
1350	5	675	2 ¹ / ₂
1800	10	900	5
2250	15	1125	7 ¹ / ₂
2700	20	1350	10
2900 (Max.)	22	1450	11

Ignition Switch—Ford Coincidental (Combination Ignition Switch and Steering Post Lock).

GENERATOR

Rotation, L. H., Com. End

Ford, Type 40-10000

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.7	10	1200	7.6
3	800	6.9	10 ¹ / ₂	1300	7.7
5	900	7.3	10 ³ / ₄	1400	7.8
7	1000	7.4	11	1500 (Max.)	7.9
9	1100	7.5	10 ¹ / ₂	1700	7.9

Motoring Freely—6 amps. at 6 volts.

Max. Stall Current—25 amps. at 5 volts.

Field Test—5¹/₄ amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on main; 20 to 24 oz. on third.

Armature—Ford 18-10005-A.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Ford

Closes—7 to 7¹/₂ volts.

Opens—0 to 2¹/₂ amps. discharge.

Contact Gap—.015 to .020 inch.

Core Gap—.010 inch, contact closed.

LIGHTING

Switch—Ford, Type B-11673.

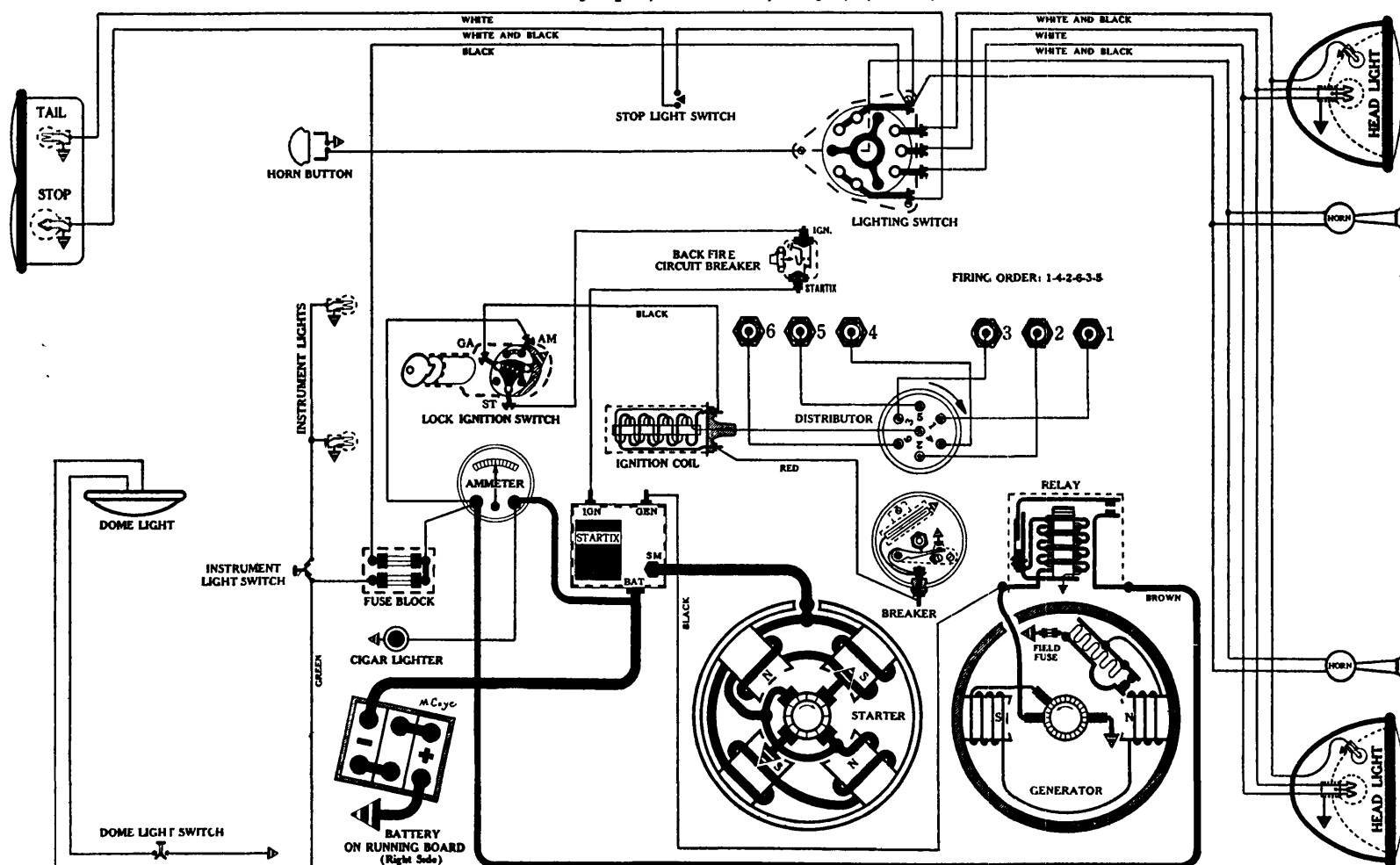
Location—Foot of steering column. Lights controlled by lever on steering wheel. Wires soldered to terminals.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on dash, behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1000; AUX.—63; INSTRUMENT—81; DOME—63; STOP AND TAIL—1158.

FRANKLIN

Model Olympic, Series 18, 6 cyl., (1933)



BATTERY

Willard, WH-1-13, 6 volts. Positive Terminal Grounded
 Starting Capacity—120 amps. for 20 minutes.
 Lighting Capacity—5.1 amps. for 20 hours.
 Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, R. H., Com. End
 Delco-Remy, 723-C

Connection to Engine—Bendix Drive, Type L-10X-TF.

NOTE.—Gear reduction job. Pinion cut on armature shaft drives gear on Bendix shaft.

Running Free—70 amps. at 5 volts, 3500 R.P.M.
 Cranking Engine—160 to 170 amps. at 4.3 volts.
 Lock Torque—22 pound-feet, 600 amps. at 3 volts.
 Brush Spring Tension—24 to 28 oz. on each.
 Starting Switch—"Startix," Type D, Automatic Starting Switch and Anti-Stall Device, in conjunction with Startix Backfire Circuit Breaker fitted to intake manifold.
 Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 644-E

Breaker—Contact separation .020 inch, or 25 cam degrees.
 Contact Spring Tension—18 to 20 oz.

Timing—IMPORTANT! Time ignition in full advance position. Remove engine air housing over fan, that position of flywheel marks may be observed. No. 1 piston is in firing position when "O" mark on fan wheel is 1 inch to the right (generator side) of the mark found inside of fan housing, if piston is on compression stroke. When fan is in this position breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 6, in conjunction with plate No. 120. (Place plate on top of No. 113 adapter to prevent rod from sliding thru). Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .015 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type C-7); Gap .025 inch.

Firing Order—1-4-2-6-3-5.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—31 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
300	Start	150	Start
400	2	200	1
1100	14	550	7
1700	22	850	11
2200 (Max.)	31	1100	15½

Ignition Coil—Delco-Remy, 532-C.

Lock Ignition Switch—Mitchell Specialty, Type 17-S.

GENERATOR

Rotation, L. H., Com. End.
 Delco-Remy, 957-E

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	12	1200	7.8
5	800	7.1	16	1600	8.
9	1000	7.5	19	1800 (Max.)	8.2

NOTE.—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—15 to 17 amps. at 6 volts.

Field Test—3 amps. at 6 volts across field coils in series.

Field Fuse—6 amps. (Type 7A-6).

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 828292.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-V.

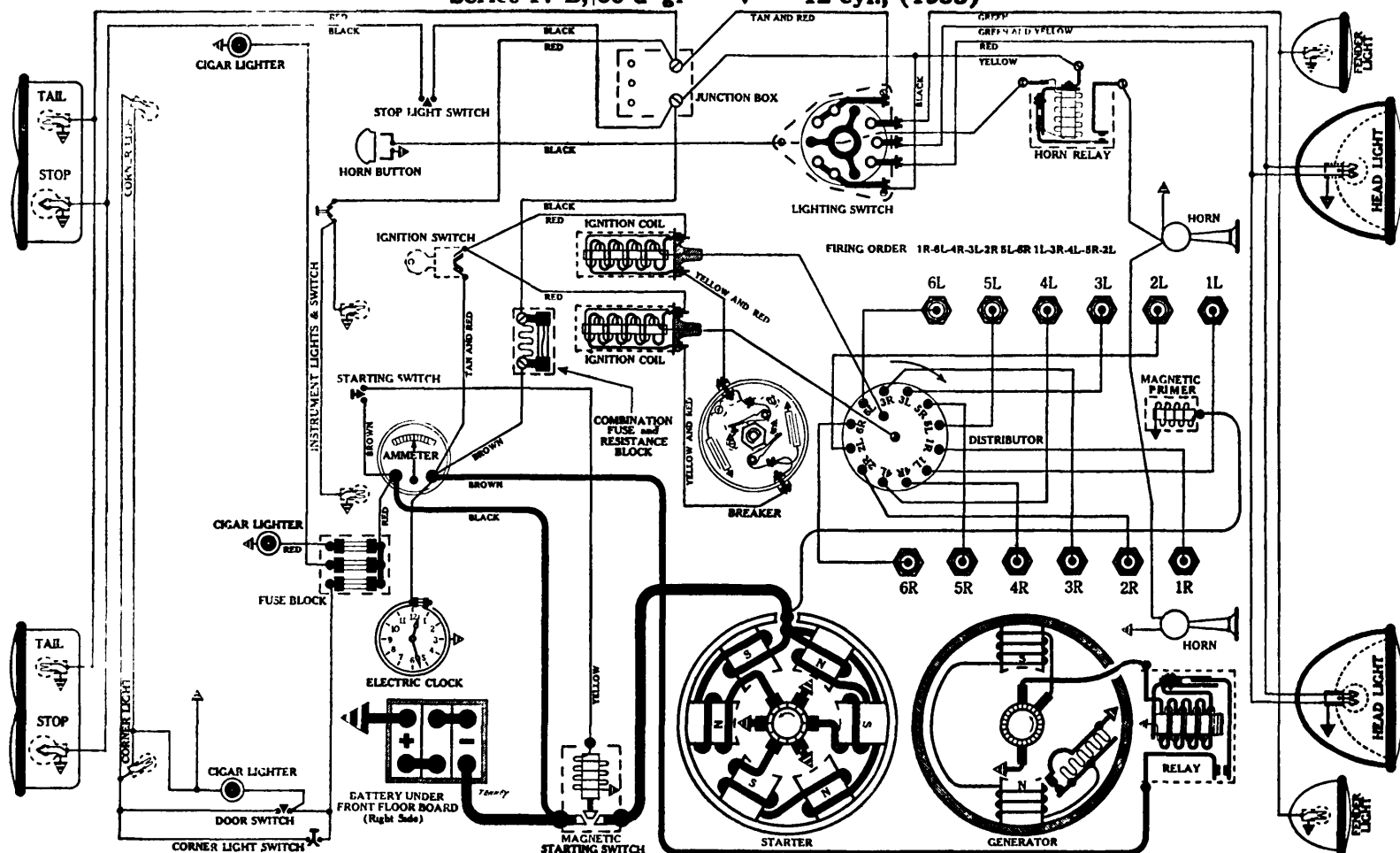
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two 20 amp. fuses (type 3A-20) mounted on fuse block behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; AUX.—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

FRANKLIN

Series 17-B, 60 d gr "V" 12 cyl., (1933)



BATTERY

Willard, RH-5-19, 6 volts. Positive Terminal Grounded

Starting Capacity—180 amps. for 20 minutes.

Lighting Capacity—7.6 amps. for 20 hours.

Box—Length, 13; width, 7-1/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End.

Delco-Remy, 545

Connection to Engine—Bendix Drive, Type R11X.

Running Free—70 amps. at 5 volts, 3000 R.P.M.

Cranking Engine—255 to 270 amps. at 4 1/2 volts.

Lock Torque—19 pound-feet, 500 amps. at 3 volts.

Brush Spring Tension—36 to 40 oz. on each.

Starting Switch—Delco-Remy Solenoid, 1371.

Armature—Delco-Remy, 37895.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 667-A

Breakers—Contact separation .018 inch, or 18 cam degrees.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 30 degrees after stationary.

Equal intervals of 30 degrees between interruptions.

Timing—IMPORTANT! Time ignition in full advance position. Remove engine air housing over fan, that position of flywheel marks may be observed. No. 1R piston is in firing position when "O" mark on fan wheel is 3/4 inch to the right (generator side) of the mark found inside of fan housing, if piston is on compression stroke. When fan is in this position the stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1R spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 6, in conjunction with plate No. 120. (Place plate on top of No. 113 adapter to prevent rod from sliding thru). Slowly turn engine until No. 1R piston is coming up on compression stroke. Stop when .017 inch before T.D.C., as indicated on Gauge. With rotor under No. 1R Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—18-MM (Champion type C-7); Gap .025 inch.

Firing Order—1R-6L-4R-3L-2R-5L-6R-1L-3R-4L-5R-2L.

Manual Advance—15 degrees (on Flywheel).

Automatic Advance—12 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	Start	200	Start
800	2	400	1
1200	4	600	2
2000	8	1000	4
2400	10	1200	5
2800 (Max.)	12	1400	6

Ignition Coils—Delco-Remy, 532-C.

Ignition Switch—Clum, No. 9193.

GENERATOR

Rotation, L. H., Com. End.

Delco-Remy, 931-G

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	400	6.4	16	720	7.8
4	460	6.7	20	840	8.
8	520	7.	24	1400 (Max.)	8.4

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5 1/2 volts.

Field Test—3 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco Remy, 1844671.

Third Brush Adjustment—Loosen cover band. Sec Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-V.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

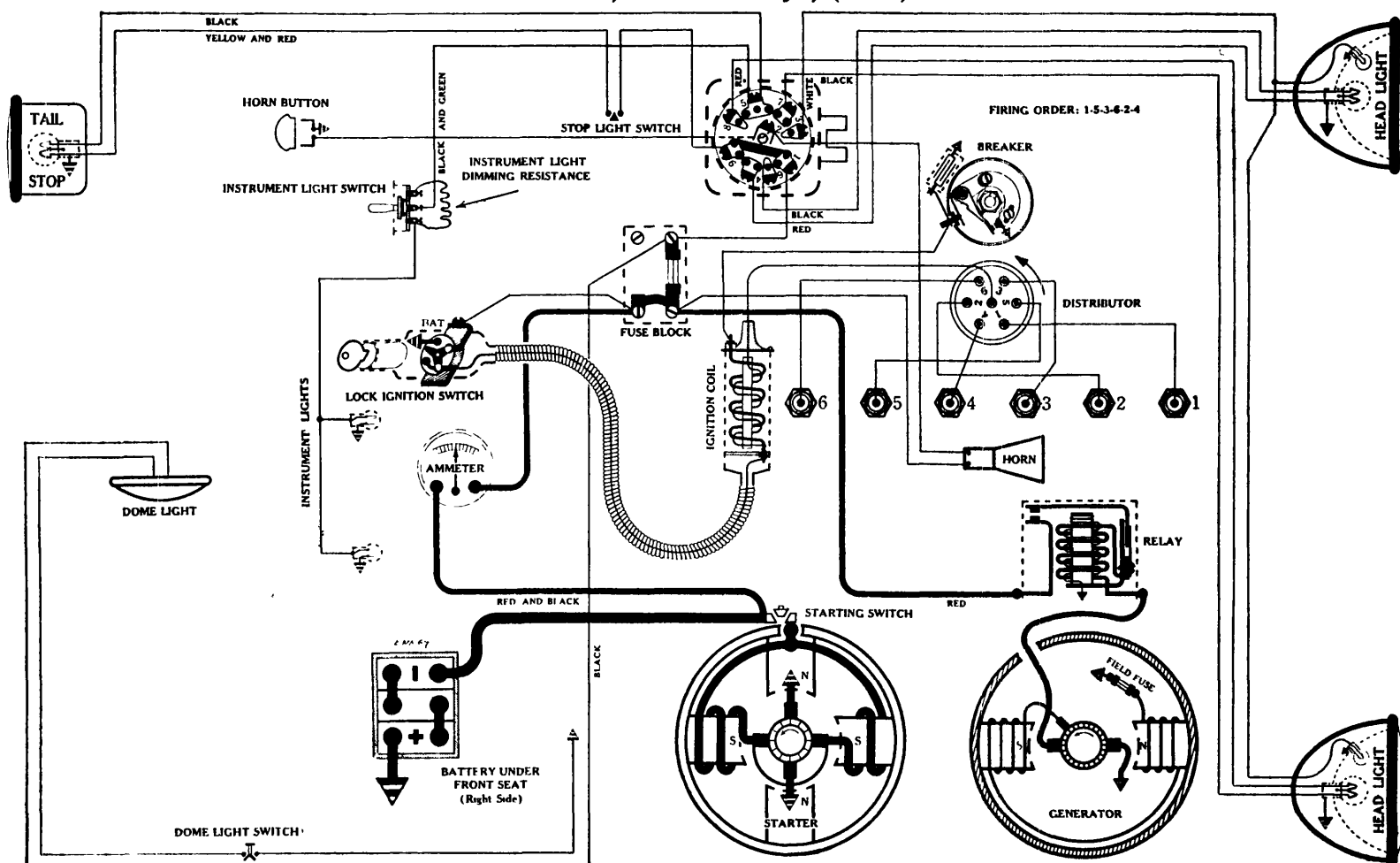
Fuses—20 amp. fuse (type 5A-20), mounted on combination fuse block and resistance assembly. Three 20 amp. fuses (type 3A-20) on fuse block for cigar lighters and body lights.

Horn Relay—Klaxon, 266-T.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; FENDER—63; INSTRUMENT—63; DOME—87; STOP—87; TAIL—63.

GRAHAM

Model 65, Standard 6 cyl., (1933)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—105 amps. for 20 minutes.

Lighting Capacity—4.3 amps. for 20 hours.

Box—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End.

Delco-Remy, 734-N

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—165 to 180 amps. at 4.2 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, L. H., Top View

Delco-Remy, 632-Z

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch, or 26 cam degrees.

Contact Spring Tension—18 to 20 oz.

Timing—With No. 1 piston on compression stroke bring flywheel mark "SA-1" (which mark is 3 degrees or 5/16 inch on flywheel before T.D.C.) directly under pointer in flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .004 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—3/8 inch (Champion type C-4); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—21 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
1000	Start	500	Start
1550	4	775	2
2100	8	1050	4
3200	16	1600	8
3900 (Max.)	21	1950	10 1/2

Coil and Lock Switch Assembly—Delco-Remy, 536-U.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 965-V

Performance Data—Gen cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	11	1200	7.9
3	800	7.	15	1400	8.
5	1000	7.2	18	2000 (Max.)	8.2

Motoring Freely—3 to 3 1/2 amps. at 6 volts.

Max. Stall Current—19 to 20 amps. at 6 volts.

Field Test—2 amps. at 6 volts across field coils in series.

Field Fuse—6 amps. (type 7A-6).

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1844827.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9463 (Special Five Position "Flex-Beam" Switch, not interchangeable with previous models).

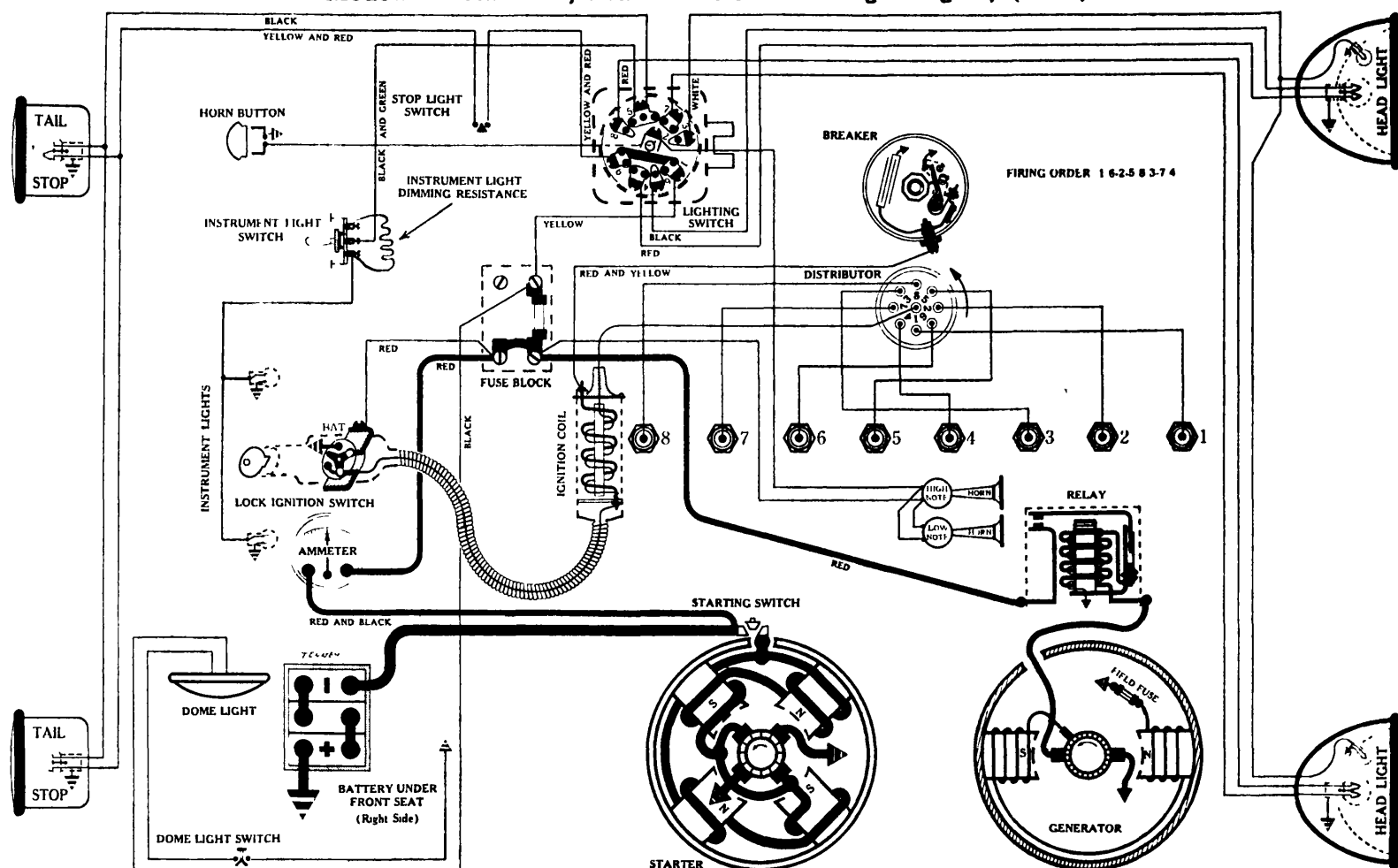
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20) mounted on dash (driver's side).

Lamps—See Lamp Table, Sec. AA. HEAD—1000; AUX.—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

GRAHAM

Models 64 Standard, and 57-A Custom Straight Eights, (1933)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—122 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours.
Box—Length, 10 5/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 725-K

Connection to Engine—Mechanical gear shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—165 to 185 amps. at 4.2 volts.
Lock Torque—16 pound feet, 600 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each.
Starting Switch—Delco-Remy, 820052.
Armature—Delco Remy, 822187.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 661-J

Breaker Contact separation .014 inch, or 16 cam degrees.
Contact Spring Tension—19 to 23 oz.

Timing—With No. 1 piston on compression stroke, bring flywheel mark "SA-1" (found 3 degrees or 5/16 inch ahead of flywheel mark "T.D.C.") opposite pointer on flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .003 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker point should just open.

Spark Plugs—3/8 inch (Champion type C-5); Gap .024 inch.

Firing Order—1-6-2-5-8-3 7-4.

Automatic Advance—17 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
1000	Start	500	Start
1800	4	900	2
2600	8	1300	4
3400	10	1700	5
4100 (Max.)	17	2050	8½

Coil and Lock Switch Assembly—Delco-Remy, 536-U.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 965-V

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	11	1200	7.9
3	800	7.	15	1400	8.
5	1000	7.2	18	2000 (Max.)	8.2

Motoring Freely—3 to 3½ amps. at 6 volts.

Max. Stall Current—19 to 20 amps. at 6 volts.

Field Test—2 amps. at 6 volts across field coils in series.

Field Fuse—6 amps. (type 7A-6).

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1844827.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9463 (Special Five Position "Flex-Beam" Switch, not interchangeable with previous models).

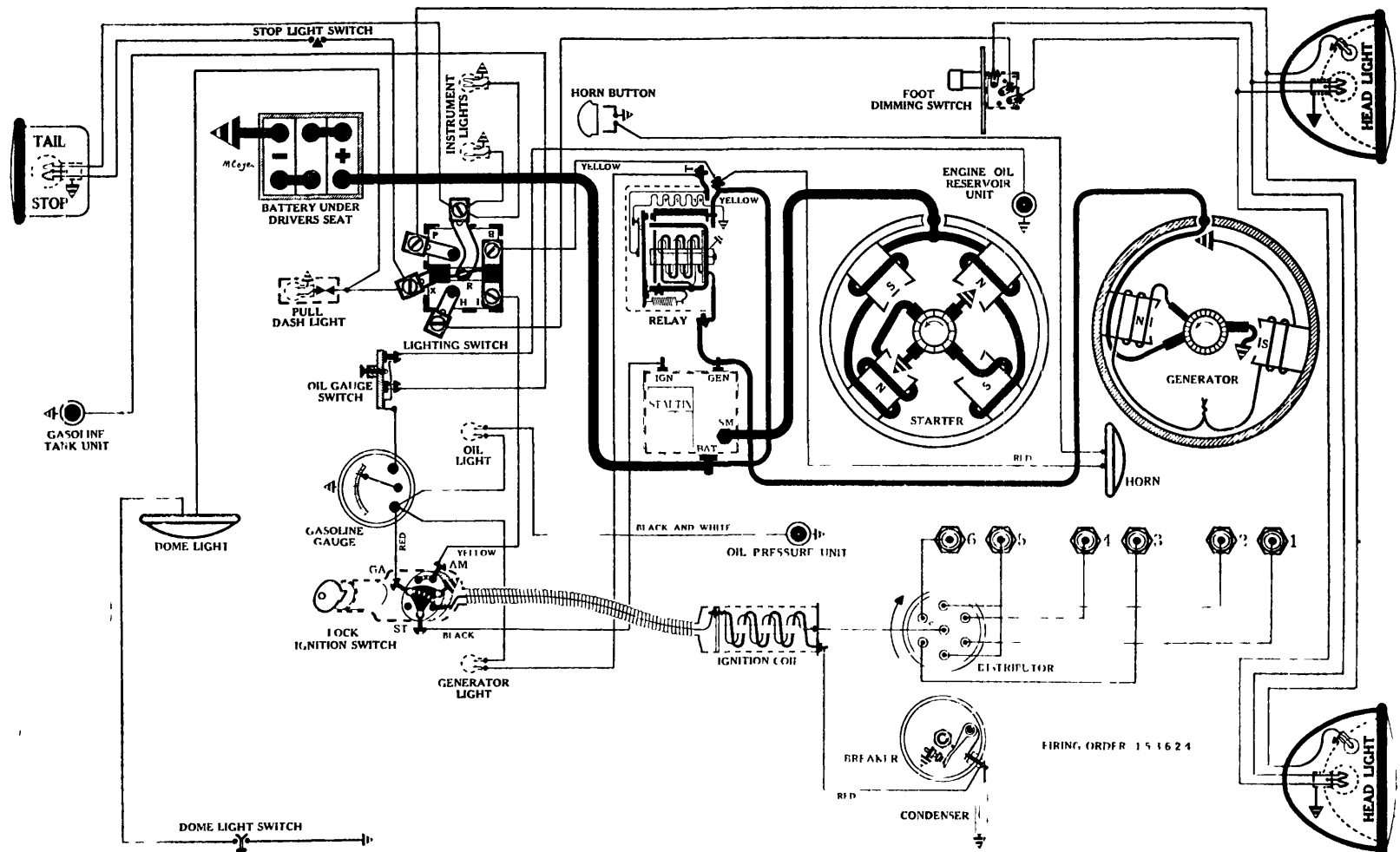
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20) mounted on dash (driver's side).

Lamps—See Lamp Table, Sec. AA. HEAD—1000; AUX.—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

HUDSON

Model E, Super Six, 6 cyl., (1933)



BATTERY

Exide, 3-VXA-15-1, 6 volts. Negative Terminal Grounded

Starting Capacity—122 amps. for 20 minutes.

Lighting Capacity—5.1 amps. for 20 hours.

Box—Length, 10-9/32; width, 7; height, 9-5/32 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite, MAJ-4025

Connection to Engine—Bendix Drive, Type LC11X-10.

Running Free—52 amps. at 5.5 volts, 5000 R.P.M.

Cranking Engine—170 amps. at 4.8 volts.

Lock Torque—12½ pound-feet, 575 amps., 3 volts.

Brush Spring Tension—36 to 40 oz. on each.

Starting Switch—"Startix," Type D, Automatic Starting Switch and Anti-Stall Device.

Armature—Auto-Lite, MAJ-2049.

IGNITION

Rotation, R. H., Top View

Auto-Lite, IGB-4074-A

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch, or 26 cam degrees.

Contact Spring Tension—17 to 19 oz.

Timing—With No. 1 piston on compression stroke, bring flywheel mark "DC 1-6" opposite pointer cast in flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 114 and rod No. 9. Slowly turn engine until No. 1 piston reaches exact T.D.C. (compression stroke), as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (Champion type J-7); Gap .020 to .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—30 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1900	10	950	5
2700	18	1350	9
4000 (Max.)	30	2000	15

Ignition Coil and Lock Switch Assembly—Auto-Lite, IG-4605.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAM-4403, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.4	12	1320	7.4
4	880	6.8	16	1860	7.8
8	1060	7.1	17	2400 (Max.)	8.

Motoring Freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—23 amps. at 5.9 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 20 oz. on main; 20 to 24 oz. on third.

Armature—Auto-Lite, GAM-2055.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CBA-4002

NOTE.—This is a new type Cut out, designed for use on cars with a generator charging "Tell Tale" light, instead of the conventional ammeter. This unit has a third terminal stamped "T", which is grounded thru an extra set of points, and a resistance wire, when the regular cut out points are open.

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

"Tell-Tale" Circuit Test—1 amp. at 6 volts between terminal "T" and cut out frame (ground).

LIGHTING

Switch Soreng Manegold, No. B5670-A.

Location—Behind instrument board, operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on lighting switch.

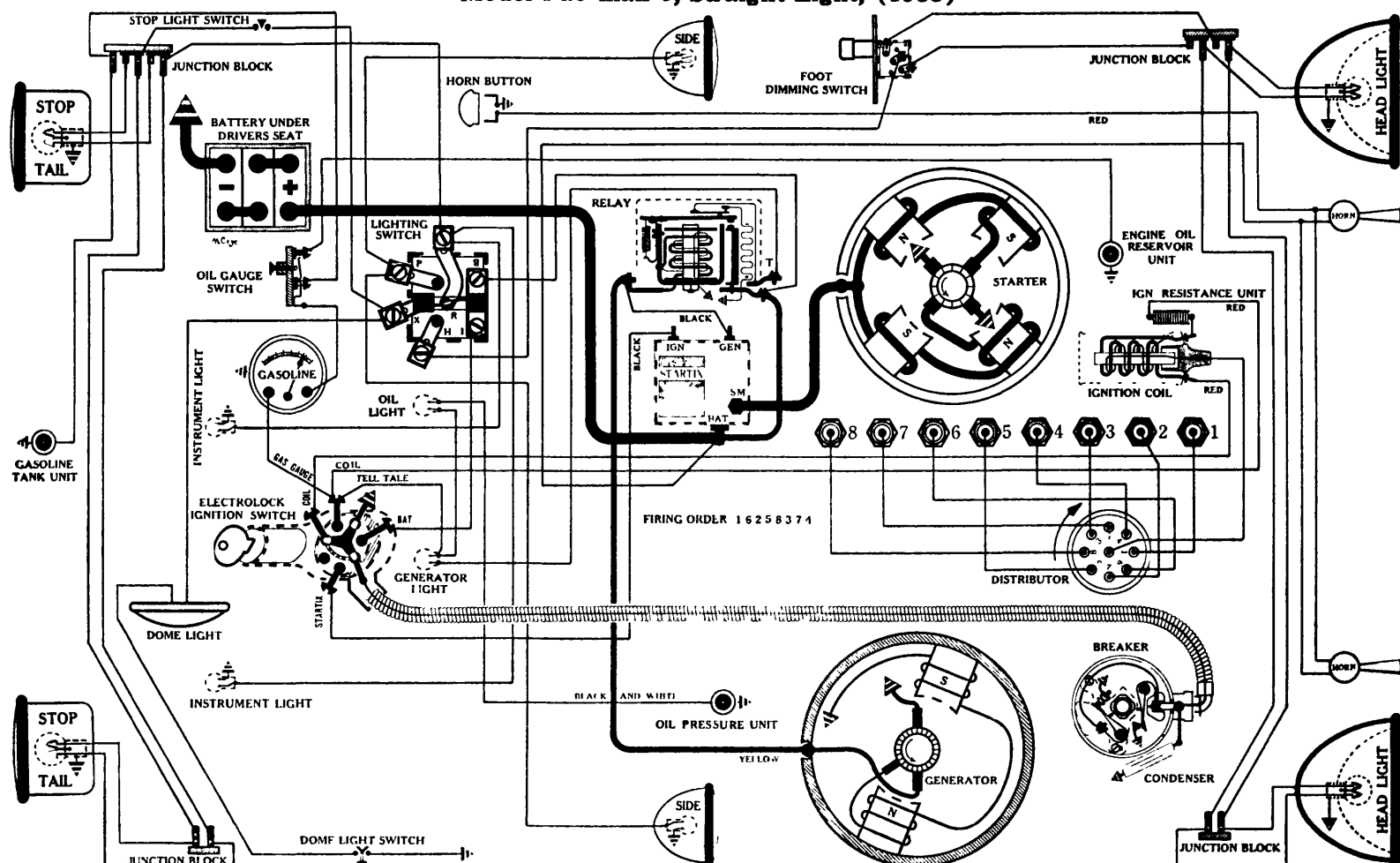
Foot Dimming Switch—Soreng-Manegold, C2100-A.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; PARKING (AUX., FENDER or SIDE)—63; DOME—87; INSTRUMENT—63; STOP AND TAIL—1158; GENERATOR AND OIL TELL-TALE—64; IMPORTANT! This is a double contact bulb.

HUDSON

Model Pac mak r, Straight Eight, (1933)



BATTERY

Exide, 3-VXA-15-1, 6 volts. Negative Terminal Grounded

Starting Capacity—122 amps. for 20 minutes.

Lighting Capacity—5.1 amps. for 20 hours.

Box—Length, 10-9/32; width, 7; height, 9-5/32 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite, MAB-4041

Connection to Engine—Bendix Drive, Type LC11X-10.

Running Free—46 amps. at 5.5 volts, 4020 R.P.M.

Cranking Engine—170 to 185 amps. at 5 volts.

Lock Torque—17 pound-feet, 520 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (with new brushes).

Starting Switch—"Startix," type D, Automatic Starting Switch and Anti-Stall Device.

Armature—Auto-Lite, MAB-2094.

IGNITION

Rotation, R. H., Top View

Auto-Lite, IGH-4009-B

(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch, or 56 cam degrees.

Contact Spring Tension—17 to 19 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—On engines using straight run gasoline; with No. 1 piston on T.D.C., power stroke flywheel mark "DC 1-8" opposite pointer, rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open. On engines using Ethyl gasoline, set stationary breaker points to open when flywheel mark "DC 1-8" is 1 1/4 inches below pointer, as No. 1 piston is coming up on compression stroke.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. On engines using straight run gasoline stop when piston reaches exact T.D.C., as indicated on Gauge. On engines using Ethyl gasoline stop when .021 inch before T.D.C. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—14-MM (Champion type J-7); Gap .022 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Spark Advance—35 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
2400	18	1200	9
3600	30	1800	15
4000 (Max.)	35	2000	17 1/2

Ignition Coil—Auto-Lite, CE-4017.

Ignition Switch—"Electrolock," type 15-S.

GENERATOR

Rotation, L. H., Com. End.

Auto-Lite, GAL-4344 or GAL-4544

NOTE—Characteristics of GAL-4544 same as GAL-4344, only difference is in style of brush holder.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.2	11	1000	7.1
4	700	6.4	13	1200	7.5
7	800	6.7	13 1/2	1400 (Max.)	7.5

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—26 amps. at 5.7 volts.

Field Test—4 amps. at 6 volts across field coils in series.

Brush Spring Tension—17 to 22 oz. on each.

Armature—Auto-Lite, GAL-2237.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CBA-4002

NOTE—This is a new type Cut out, designed for use on cars with a generator charging "Tell-Tale" light, instead of the conventional ammeter. This unit has a third terminal stamped "T", which is grounded thru an extra set of points, and a resistance wire, when the regular cut-out points are open.

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

"Tell-Tale" Circuit Test—1 amp. at 6 volts between terminal "T" and cut-out frame (ground).

LIGHTING

Switch—Soreng-Manegold, No. B5670-A.

Location—Behind instrument board, operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on lighting switch.

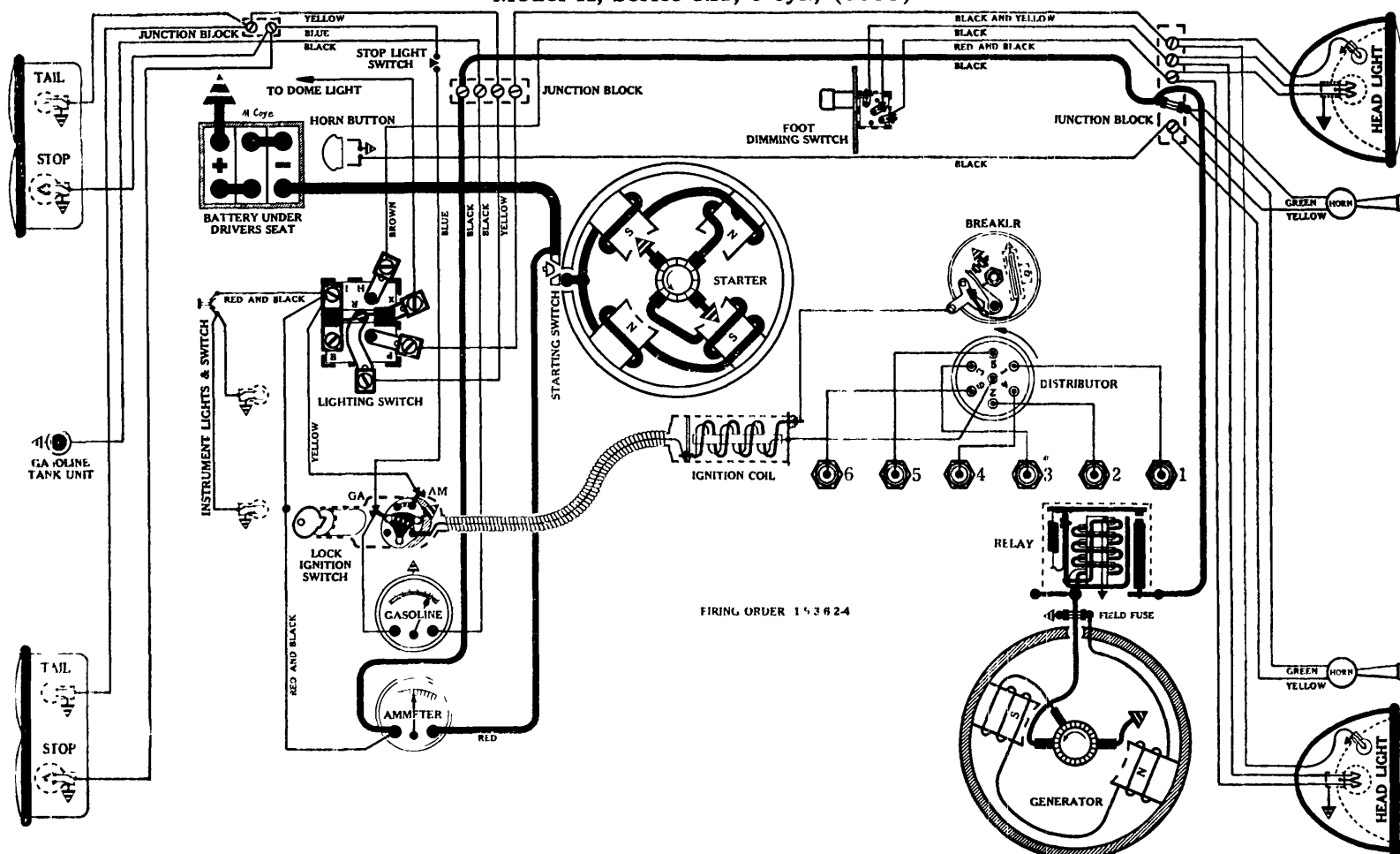
Foot Dimming Switch—Soreng-Manegold, A2100-A.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1000; SIDE—63; INSTRUMENT—63; DOME—87; STOP AND TAIL—1158; GENERATOR AND OIL TELL-TALE—64. IMPORTANT! This is a double contact bulb.

HUPMOBILE

Model K, Series 321, 6 cyl., (1933)



BATTERY

Willard, WH-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—140 amps. for 20 minutes.
Lighting Capacity—5.7 amps. for 20 hours.
Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4050

Connection to Engine—Bendix Drive, Type L11X-10.
Running Free—60 amps. at 5½ volts, 3700 R.P.M.
Cranking Engine—160 amps. at 5.2 volts, 225 R.P.M.
Lock Torque—15 pound-feet, 575 amps. at 3 volts.
Brush Spring Tension—44 to 56 oz. on each.
Starting Switch—Auto-Lite, MU-2208-S, mounted on starter.
Switch should not close with less than 7½ lbs. pull applied at right angles to hole in extreme end of lever.
Armature—Auto-Lite, MAB-2047.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGC-4056

Breaker Contact separation .018 inch, or 26 cam degrees.
Contact Spring Tension—17 to 19 oz.
Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke, slowly turn engine until flywheel mark "Ign. Adv" (found 7 degrees ahead of mark "DC 1-6") is in line with finished bosses on front face of clutch housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston is .018 inch before T.D.C., as indicated on Gauge. With spark in full advanced position, rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—18-MM (Champion type C-7); Gap .028 to .030 inch.
Firing Order—1-5-3-6-2-4.
Manual Advance—24 degrees (on Flywheel).
Automatic Advance—14 degrees (on Flywheel).
Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance
(on flywheel) (on cam)
800 Start 400 Start
1350 4 675 2
1900 8 950 4
2500 12 1250 6
2800 (Max.) 14 1400 7
Ignition Coil and Lock Switch Assembly—Auto-Lite, IG-4604.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAL-4524, (Driven by Timing Chain)

Performance Data—Gen. Cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	650	6.5	10	1075	7.3
2	720	6.6	14	1340	7.7
5	850	7.	16	1800 (Max.)	8.

Motoring Freely—4½ to 5 amps. at 6 volts.
Max. Stall Current—16 to 19 amps. at 6 volts.
Field Test—4½ amps. at 6 volts across field coils in series.
Field Fuse—7½ amps. (type 1A-7½).
Brush Spring Tension—10 to 13 oz. on each.
Armature—Auto-Lite, GAL-2121.
Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4014

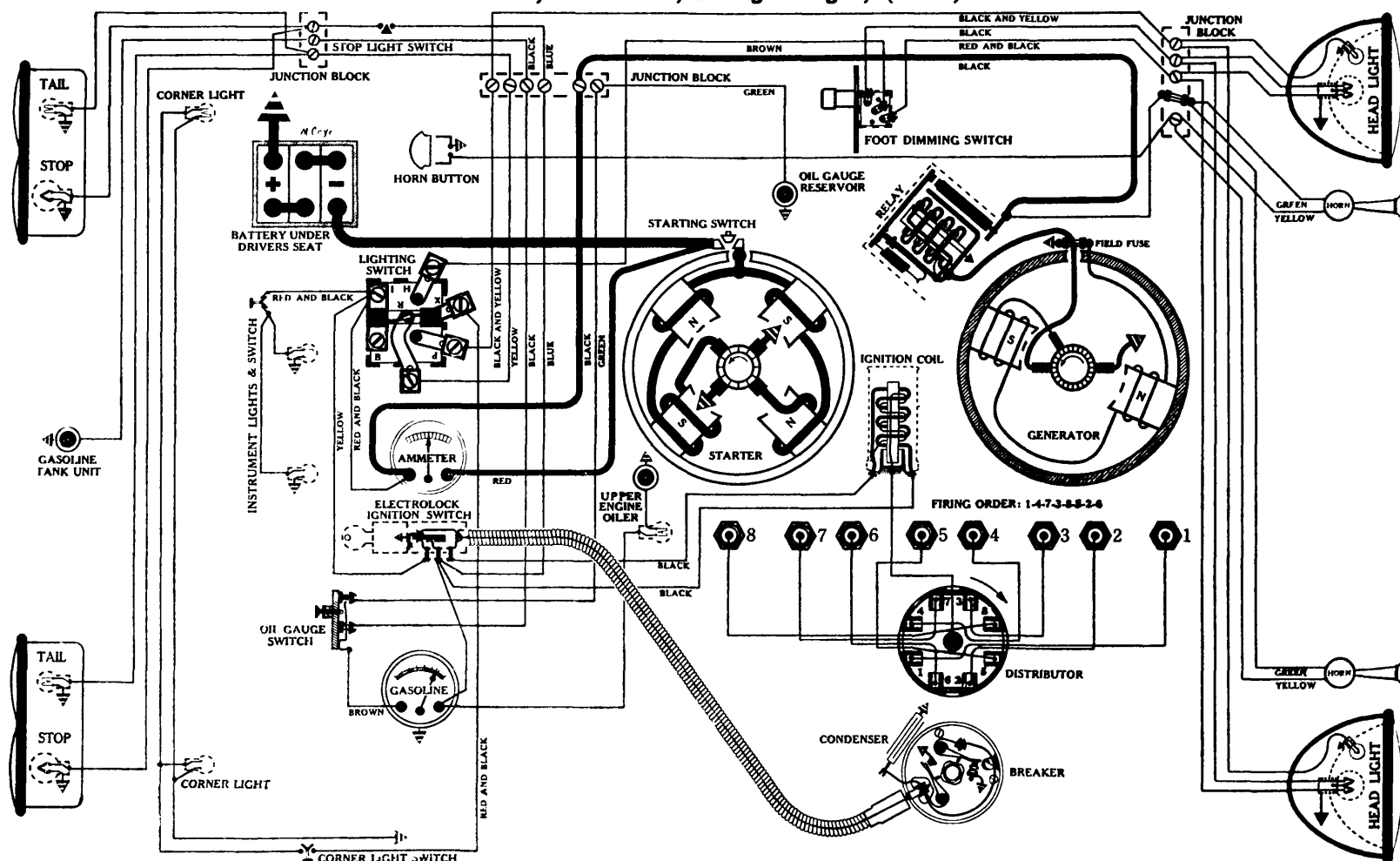
Closes —7 to 7½ volts.
Opens ½ to 2½ amps. discharge.
Contact Gap .025 to .035 inch.
Core Gap .010 to .012 inch, contacts closed.

LIGHTING

Switch Soreng-Manegold, D-5670-A, as shown. Interchangeable with Briggs & Stratton Switch No. 70726, shown on Hupmobile, Model B, Series 216, 1932.
Location—Behind instrument board. Operated by pull knob.
Foot Dimming Switch—Soreng-Manegold, No. B-2100-A.
Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch back. Spare fuse on switch bracket. Horn Circuit—Single 20 amp. fuse (type 3A-20) found on junction block located near lower left corner of radiator, under hood.
Lamps—See Lamp Table, Sec. AA. HEAD—1000; AUX.—63; REAR—63; INSTRUMENT—63; DOME—81; STOP—87.

HUPMOBILE

Model F, Series 322, Straight Eight, (1933)



BATTERY
Willard, WH-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—140 amps. for 20 minutes.
Lighting Capacity—5.7 amps. for 20 hours.
Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

STARTER
Rotation, L. H., Com. End
Auto-Lite, MAD-4118
Connection to Engine—Bendix Drive, Type R10XD.
Running Free—60 amps. at 5.5 volts, 3750 R.P.M.
Cranking Engine—165 to 175 amps. at 5.25 volts.
Lock Torque—13 pound-feet, 505 amps., 3 volts.
Brush Spring Tension—14 to 56 oz. on each.
Starting Switch—Auto Lite, SW-3737-S, mounted on starter.
Switch should not close with less than 2.3 lbs. pull applied at right angles to hole in extreme end of lever.
Armature—Auto-Lite, MAD-2083.

IGNITION
Rotation, R. H., Top View
Auto-Lite, IGH-4021-A
Breakers—Contact separation .020 inch, or 56 cam degrees.
Contact Spring Tension—17 to 19 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke, bring flywheel mark (found 15/16 inches, or 9 degrees, ahead of "18-DC"), so that it will register with center line of flywheel housing peep hole. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .033 inch before T.D.C., as indicated on Gauge. With spark in full advanced position, rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—18-MM (Champion type C-7); Gap .026 to .030 inch.
Firing Order—1-4-7-3-8-5-2-6.
Manual Advance—26 degrees (on Flywheel).
Automatic Advance—13 degrees (on Flywheel).
Eng. R.P.M. Degrees Advance Dist. R.P.M. Degrees Advance
(on flywheel) (on cam)

800	Start	400	Start
1200	2	600	1
1900	6	950	3
2300	8	1150	4
3000	12	1500	6
3200 (Max.)	13	1600	6½

Ignition Coil—Auto-Lite, CE-4402.
Ignition Switch—"Electrolock", type 5-B.

GENERATOR
Rotation, L. H., Com. End
Auto-Lite, GAR-4317 (Belt Drive)
Performance Data—Gen. Cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	500	6.5	10	1000	7.8
2	550	6.9	16	1300	8.1
6	800	7.3	18	1450 (Max.)	8.3

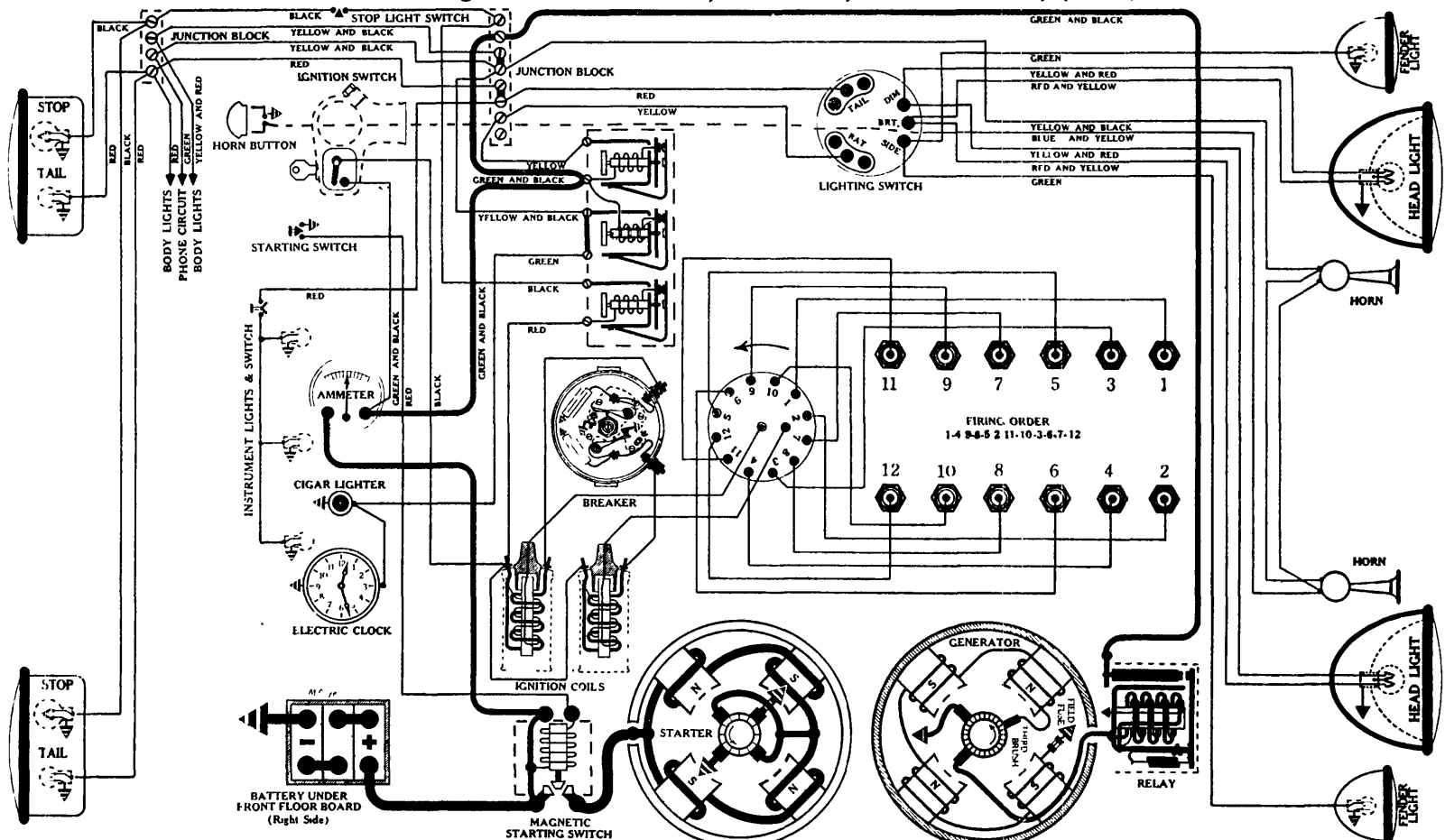
Motoring Freely—5½ amps. at 6 volts.
Max. Stall Current—23 to 25 amps. at 6 volts.
Field Test—5 amps. at 6 volts across field coils in series.
Field Fuse—7½ amps. (type 1A-7½).
Brush Spring Tension—22 to 25 oz. on main; 30 to 34 on third.
Armature—Auto-Lite, GAR-2181.
Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY
Auto-Lite, CB-4011
Closes—7 to 7½ volts.
Opens—½ to 2½ amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .012 inch, contacts closed.

LIGHTING
Switch—Soreng-Manegold, D-5670-A, as shown. Interchangeable with Briggs & Stratton Switch No. 70726, shown on Hupmobile, Model B, Series 216, 1932.
Location—Behind instrument board. Operated by pull knob.
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch back.
Horn Circuit, Single 20 amp. fuse (type 3A-20) found on junction block, located near lower left corner of radiator, under hood.
Foot Dimming Switch—Soreng-Manegold, B-2100-A.
Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.
Lamps—See Lamp Table, Sec. AA. HEAD—1000; AUX.—63; INSTRUMENT—63; VALVE OILER TELL-TALE—64; DOME—81; STOP—87; TAIL—63.

LINCOLN

Model 67 degree Small "Vee" 12, Series 251, 136 inch W. B., (1933)



BATTERY

Exide; LX-15-21L, 6 volts. Negative Terminal Grounded
Starting Capacity—155 amps. for 20 minutes.
Lighting Capacity—7 amps. for 20 hours.
Box—Length, 14½; width, 7-5/16; height, 8-7/8 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAO-4005

Connection to Engine—Bendix Drive, Type RB10FXXTD.
Running Free—50 amps. at 5½ volts.
Cranking Engine—200 to 225 amps. at 4.1 volts.
Lock Torque—35 pound-feet, 720 amps. at 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Owen-Dyneto.
Location—Mounted on starter. Magnetic type switch, controlled by press button on instrument board.
Armature—Auto-Lite, MAO-2006.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGM-4002

WATCH OUT! This same distributor is used on both the 1933, 65 degree and 67 degree engines, but with different synchronizing adjustments. Make sure you know which engine the unit belongs on before adjusting.

Breakers—Contact separation .018 inch, or 19 cam degrees.
Contact Spring Tension—20 to 22 oz. on each.

Synchronizing—Movable points open 33½ degrees after stationary. Unequal intervals of 33½-26½-33½, etc. degrees between interruptions. The stationary, or right hand set of breaker points control the right hand ignition coil, which distributes current thru the "off-center" high tension terminal on the distributor cap, and fires the right bank, or even numbered cylinders.

Timing—IMPORTANT! Time ignition in full advance position. Remove inspection cover on flywheel housing. Remove No. 2 spark plug, and slowly turn engine until No. 2 piston is coming up on compression stroke. Stop when flywheel mark "A-2" is opposite pointer. In this position the right hand, or stationary set of breaker points should just open. The line on flywheel marked "A-1" is for locating the position of (or synchronizing) the movable set of breaker points.

Timing with MOTOR GAUGE—Remove No. 2 spark plug, and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 2 piston is coming up on compression stroke. Stop when .017 inch before T.D.C., as indicated on Gauge. With spark in full advance position, "off center" end of rotor under No. 2 Dist. Cap Terminal, the stationary set of breaker points should just open.

Spark Plugs—¾ inch (Champion type C-4); Gap .028 inch.

Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.

NOTE—All odd cylinder numbers on left bank; No. 1 nearest radiator. All even numbers on right bank (see diagram). High tension wires run from numbered terminals on Dist. Cap to corresponding numbers on cylinder blocks.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—26 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1200	4	600	2
1800	8	900	4
2400	12	1200	6
3000	16	1500	8
3600	20	1800	10
4200	24	2100	12
4500 (Max.)	26	2250	13

Ignition Coils—Auto-Lite, CE-4001-L.

Ignition Switch—Oakes Steering Post and Ignition Lock.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBC-4001, (Driven by Timing Chain)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	400	6.3	16	720	7.6
4	460	6.7	20	930	7.8
8	520	7.	22	1250 (Max.)	8.

Motoring Freely—5 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 6 volts.

Field Test—2.7 amps. at 6 volts across field coils in series.

Field Fuse—7½ amps. (type 1A-7½), mounted in commutator end frame.

Brush Spring Tension—22 to 27 oz. on each.

Armature—Auto-Lite, GBC-2006.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand; mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014-L

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Special Lincoln design, made by Essex Wire Co.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

Circuit Breakers—Triple Combination.

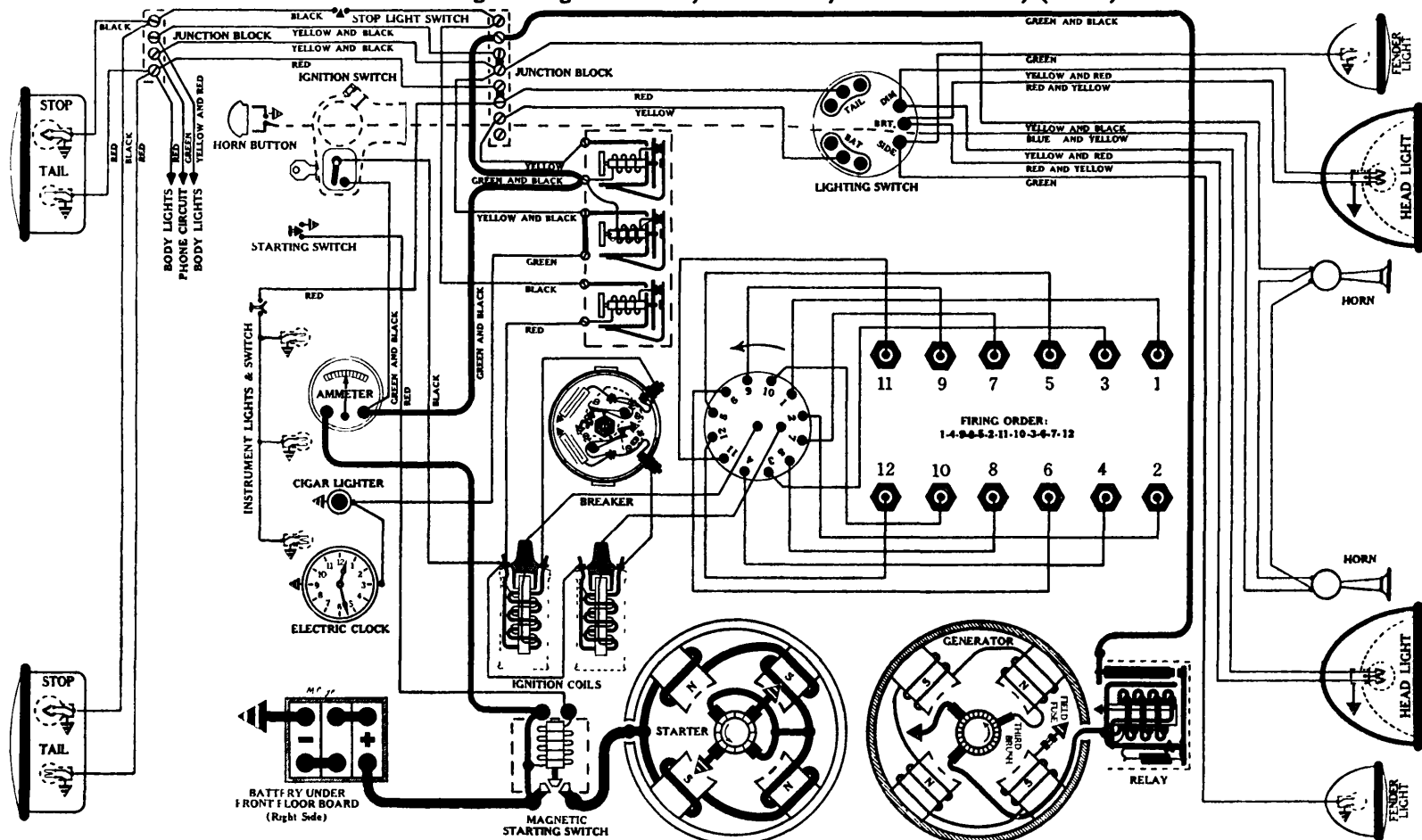
Vibrating—Starts 25 to 30 amps. Operates 10 to 15.

Lock-Out—Starts 25 to 30 amps. Operates with discharge less than 1 amp.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; FENDER—63; INSTRUMENT—63; TAIL—63; DOME—81; STOP—1129.

LINCOLN

Mod 165 degr Big "Vee" 12, Series 511, 145 inch W. B., (1933)



BATTERY

Exide, LX-15-21L, 6 volts. Negative Terminal Grounded
Starting Capacity—155 amps. for 20 minutes.
Lighting Capacity—7 amps. for 20 hours.
Box—Length, 14½; width, 7-5/16; height, 8-7/8 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAO-4003

Connection to Engine—Bendix Drive, Type RB10FXXTD.
Running Free—50 amps. at 5½ volts.
Cranking Engine—200 to 225 amps. at 4.1 volts.
Lock Torque—35 pound-feet, 720 amps. at 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Owen-Dyneto.
Location—Mounted on starter. Magnetic type switch, controlled by press button on instrument board.
Armature—Auto-Lite, MAO-2006.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGM-4002

WATCH OUT! This same distributor is used on both the 1933, 65 degree and 67 degree engines, but with different synchronizing adjustments. Make sure you know which engine the unit belongs on before adjusting.

Breakers—Contact separation .018 inch, or 19 cam degrees.
Contact Spring Tension—20 to 22 oz. on each.

Synchronizing—Movable points open 32½ degrees after stationary. Unequal intervals of 32½-27½-32½, etc, degrees between interruptions. The stationary, or right hand set of breaker points control the right hand ignition coil, which distributes current thru the "off-center" high tension terminal on the distributor cap, and fires the right bank, or even numbered cylinders.

Timing—IMPORTANT! Time ignition in full advance position. Remove inspection cover on flywheel housing. Remove No. 2 spark plug, and slowly turn engine until No. 2 piston is coming up on compression stroke. Stop when flywheel mark "A-2" is opposite pointer. In this position the right hand, or stationary set of breaker points should just open. The line on flywheel marked "A-1" is for locating the position of (or synchronizing) the movable set of breaker points.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 2 piston is coming up on compression stroke. Stop when .017 inch before T.D.C., as indicated on Gauge. With spark in full advance position, "off-center" end of rotor under No. 2 Dist. Cap Terminal, the stationary set of breaker points should just open.

Spark Plugs—½ inch (Champion type C-4); Gap .028 inch.

Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.

NOTE:—All odd cylinder numbers on left bank; No. 1 nearest radiator. All even numbers on right bank (see diagram). High tension wires run from numbered terminals on Dist. Cap to corresponding numbers on cylinder blocks.

Manual Advance—20 degrees (on Flywheel).

Automatic Advance—26 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1200	4	600	2
1800	8	900	4
2400	12	1200	6
3000	16	1500	8
3600	20	1800	10
4200	24	2100	12
4500 (Max.)	26	2250	13

Ignition Coils—Auto-Lite, CE-4001-L.

Ignition Switch—Oakes Steering Post and Ignition Lock.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GBC-4101, (Driven by Timing Chain)

Performance Data—Gen. Cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	400	6.3	16	720	7.6
4	460	6.7	20	930	7.8
8	520	7.	22	1250 (Max.)	8.

Motoring Freely—5 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 6 volts.

Field Test—2.7 amps. at 6 volts across field coils in series.

Field Fuse—7½ amps. (type 1A-7½), mounted in commutator end frame.

Brush Spring Tension—22 to 27 oz. on each.

Armature—Auto-Lite, GBC-2035.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand; mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014-L

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Special Lincoln design, made by Essex Wire Co.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

Circuit Breakers—Triple Combination.

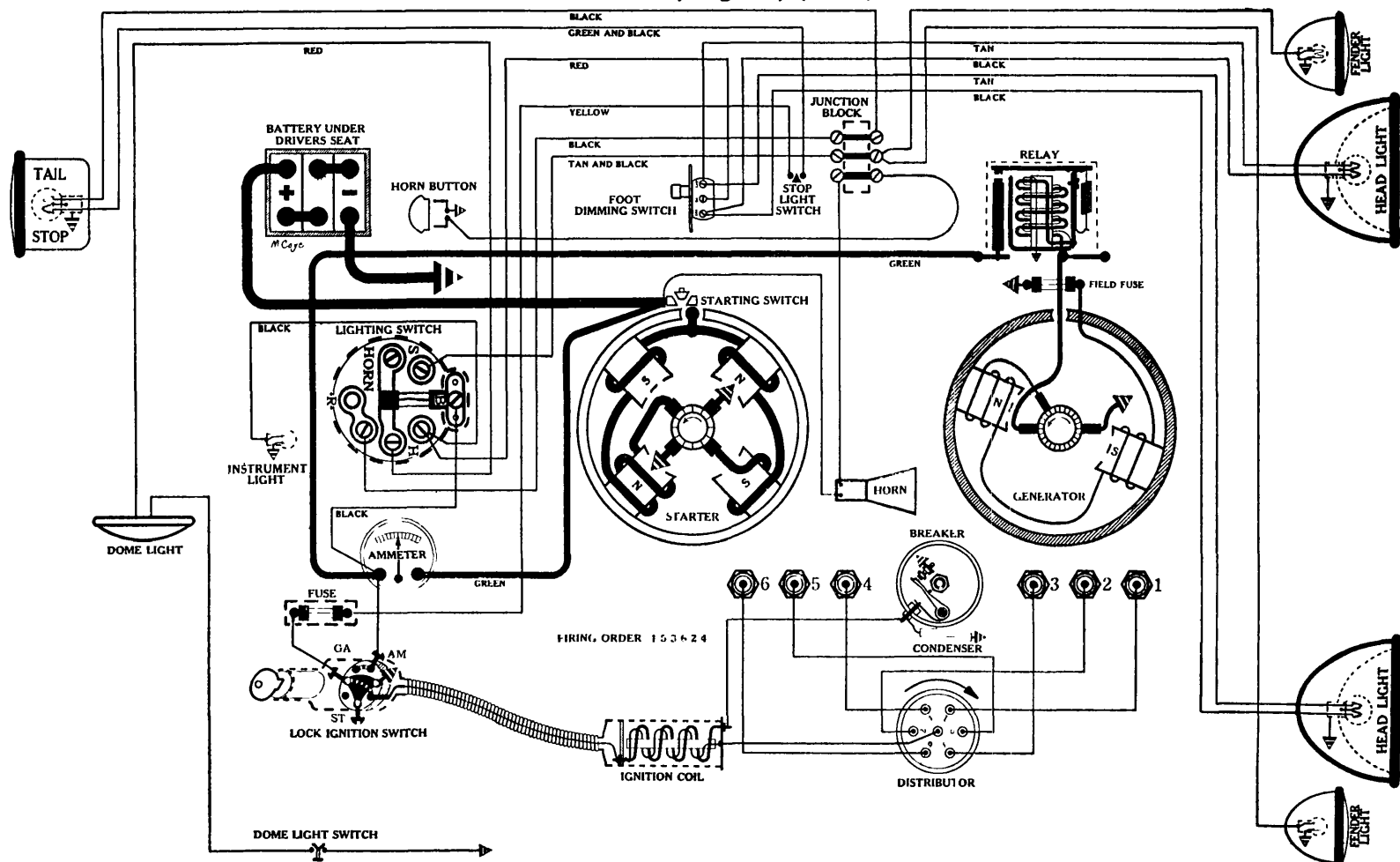
Vibrating—Starts 25 to 30 amps. Operates 10 to 15.

Lock-Out—Starts 25 to 30 amps. Operates with discharge less than 1 amp.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; FENDER—63; INSTRUMENT—63; TAIL—63; DOME—81; STOP—1129.

NASH

Model 1120, Big Six, (1933)



BATTERY

U.S.L., KW-13-A, 6 volts. Negative Terminal Grounded
 Starting Capacity—114 amps. for 20 minutes.
 Lighting Capacity—4.9 amps. for 20 hours.
 Box—Length, 9-1/16; width, 7 5/8; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAB-4049

Connection to Engine—Bendix Drive, Type L11X-10.
 Running Free—46 amps. at 5.5 volts, 4020 R.P.M.
 Cranking Engine—160 to 170 amps. at 6 volts.
 Lock Torque—17 pound-feet, 520 amps. at 3 volts.
 Brush Spring Tension—44 to 48 oz. on each.
 Starting Switch—Auto-Lite, MAB-2079-AS, mounted on starter.
 Switch should not close with less than 4 lbs. pull applied at right angles to hole in extreme end of lever.
 Armature—Auto-Lite, MAB-2057.

IGNITION

Rotation, R. H., Top View
 Auto-Lite, IGB-4081-B
 (Full Automatic Spark Advance)

Breaker—Contact separation .020 inch, or 24 cam degrees.
 Contact Spring Tension—17 to 19 oz.
 Timing—With No. 1 piston on compression stroke, slowly turn engine until the mark "Ign" (the first line) on front vibration dampener is directly under pointer on chain cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
 Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .006 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
 Spark Plugs—18-MM (AC type G-8); Gap .022 inch.
 Firing Order—1-5-3-6-2-4.
 Automatic Advance—20 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1400	6	700	3
2000	10	1000	5
2800	16	1400	8
3400 (Max.)	20	1700	10

 Ignition Coil and Lock Switch Assembly—Auto-Lite, CE-4601.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAR-4205, (Belt Drive)

Performance Data—Gen. Cold.					
Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	500	6.5	10	1000	7.8
2	550	6.9	16	1300	8.1
6	800	7.3	18	1450 (Max.)	8.3

Motoring Freely—5 1/2 amps. at 6 volts.
 Max. Stall Current—23 to 25 amps. at 6 volts.
 Field Test—5 amps. at 6 volts across field coils in series.
 Field Fuse—7 1/2 amps. (type 1A-7 1/2).
 Brush Spring Tension—22 to 25 oz. on main; 31 to 34 on third.
 Armature—Auto-Lite, GAR-2214.
 Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4021-S

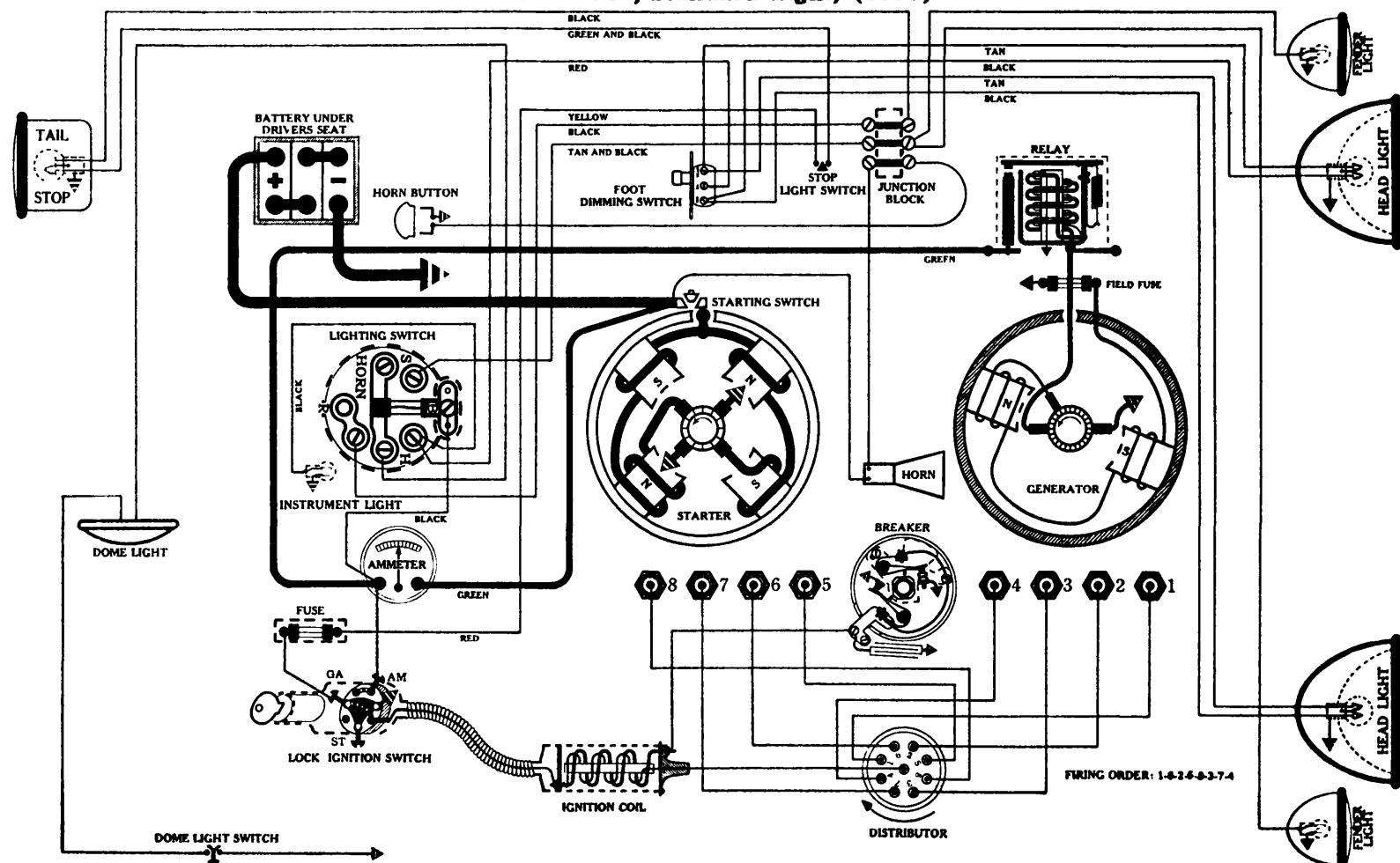
Closes 7 to 7 1/2 volts.
 Opens -1/2 to 2 1/2 amps. discharge.
 Contact Gap— .025 to .035 inch.
 Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Delco Remy, 478-N.
 Location—Behind instrument board. Operated by pull knob.
 Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch back.
 Single 10 amp. fuse (type 3A-10), mounted on fuse block behind instrument board, just above lock ignition switch, and protects stop light circuit.
 Foot Dimming Switch—Delco-Remy, 465-Z.
 Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.
 Lamps—See Lamp Table, Sec. AA. HEAD—1110; FENDER—63; INSTRUMENT—63; DOME—64; STOP AND TAIL—1158.

NASH

Mod 1 1130, Standard Eight, (1933)



BATTERY

U.S.L., KW-13-A, 6 volts. Negative Terminal Grounded

Starting Capacity—114 amps. for 20 minutes.

Lighting Capacity—4.9 amps. for 20 hours.

Box—Length, 9-1/16; width, 7 1/8; height, 9 1/2 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4049

Connection to Engine—Bendix Drive, Type L11X-10.

Running Free—46 amps. at 5.5 volts, 4020 R.P.M.

Cranking Engine—160 to 170 amps. at 6 volts.

Lock Torque—17 pound-feet, 520 amps. at 3 volts.

Brush Spring Tension—44 to 48 oz. on each.

Starting Switch—Auto-Lite, MAB-2079-AS, mounted on starter.

Switch should not close with less than 4 lbs. pull applied at right angles to hole in extreme end of lever.

Armature—Auto-Lite, MAB-2057.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGH-4023
(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch, or 56 cam degrees.

Contact Spring Tension—17 to 19 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—With No. 1 piston on compression stroke, slowly turn engine until the mark "IGN" (the first line) on front vibration dampener is directly under pointer on chain cover. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open. Movable set of breaker points should open when the single mark on dampener (found 90 degrees behind "IGN" mark) is directly under pointer.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .006 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—18-MM (AC type G-10); Gap .022 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1000	4	500	2
1400	8	700	4
1800	12	900	6
2200 (Max.)	16	1100	8

Ignition Coil and Lock Switch Assembly—Auto-Lite, CE-4601.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAR-4205, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	500	6.5	10	1000	7.8
2	550	6.9	16	1300	8.1
6	800	7.3	18	1450 (Max.)	8.3

Motoring Freely—5 1/2 amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 6 volts.

Field Test—5 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps. (type 1A-7 1/2).

Brush Spring Tension—22 to 25 oz. on main; 31 to 34 on third.

Armature—Auto-Lite, GAR-2214.

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4021-S

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-N.

Location—Behind instrument board. Operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch back.

Single 10 amp. fuse (type 3A-10), mounted on fuse block behind instrument board, just above lock ignition switch, and protects stop light circuit.

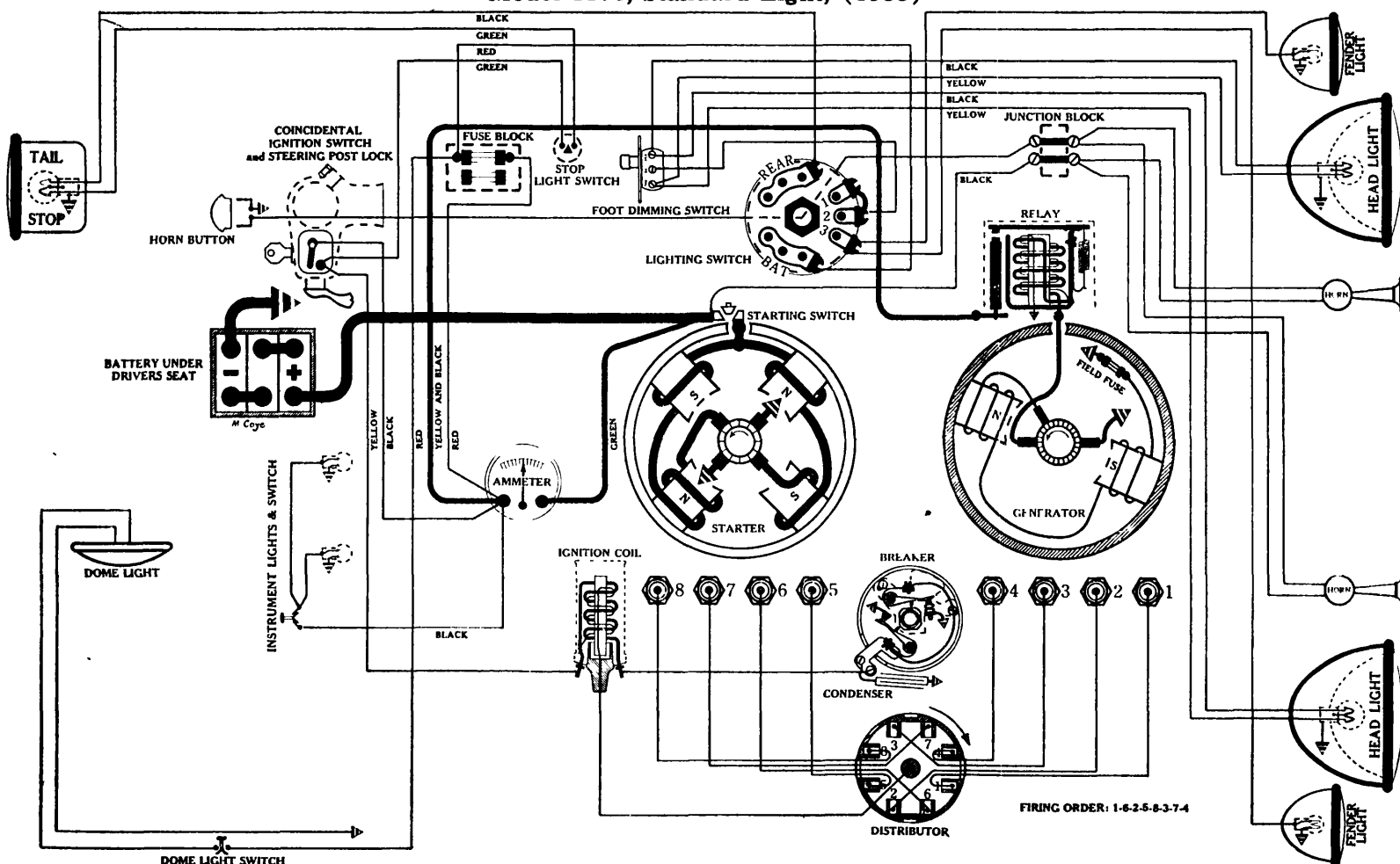
Foot Dimming Switch—Delco-Remy, 465-Z.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; FENDER—63; INSTRUMENT—63; DOME—64; STOP AND TAIL—1158.

NASH

Model 1170, Standard Eight, (1933)



BATTERY

U. S. L., KW-13-A, 6 volts. Negative Terminal Grounded
Starting Capacity—114 amps. for 20 minutes.
Lighting Capacity—4.9 amps. for 20 hours.
Box—Length, 9-1/16; width, 7 1/8; height, 9 1/8 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4026

Connection to Engine—Bendix Drive, Type L11X-10.
Running Free—46 amps. at 5.5 volts, 4020 R.P.M.
Cranking Engine—160 to 170 amps. at 6 volts.
Lock Torque—17 pound-feet, 520 amps. at 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Auto-Lite, MAB-3080, mounted on starter. Switch should not close with less than 4 lbs. pull applied at right angles to hole in extreme end of lever.
Armature—Auto-Lite, MAB-2057.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGH-4017
(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch, or 56 cam degrees.
Contact Spring Tension—17 to 19 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing—With No. 1 piston on compression stroke, slowly turn engine until the mark "IGN" (the first line) on front vibration dampener is directly under pointer on chain cover. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open. Movable set of breaker points should open when the single mark on dampener (found 90 degrees behind "IGN" mark) is directly under pointer.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .006 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—18-MM (AC type G-10); Gap .022 inch.
Firing Order—1-6-2-5-8-3-7-4.
Automatic Advance—28 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1000	4	500	2
1800	12	900	6
2600	20	1300	10
3400 (Max.)	28	1700	14

Ignition Coil—Auto-Lite, CE-4001.

Ignition Switch—Oakes Steering Post and Ignition Lock.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAL-4329, (Belt Drive)

Performance Data—Gen. Cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.3	13	1200	7.5
6	800	6.9	15	1400	7.7
10	1000	7.1	17	1900 (Max.)	8.

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—4 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps. (type 1A-7 1/2).

Brush Spring Tension—10 to 13 oz. on each.

Armature—Auto-Lite, GAL-2006.

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch. contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 4210-A.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20), with spare, mounted on dash, left side, under hood.

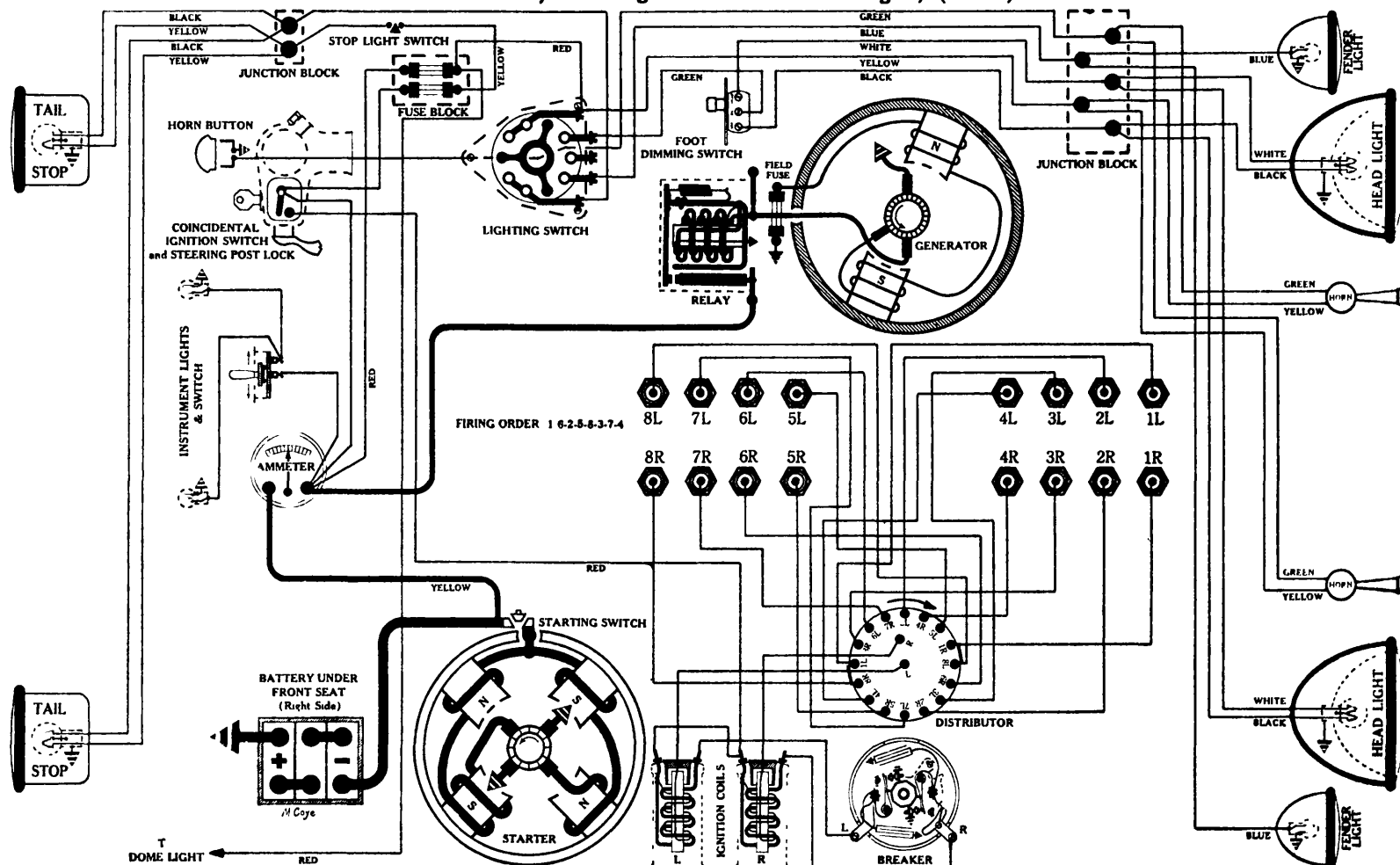
Foot Dimming Switch—Delco-Remy, 465-Z.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; FENDER—63; DOME—64; INSTRUMENT—63; STOP AND TAIL—1158.

NASH

Model 1180, Twin Ignition Advanced Eight, (1933)



BATTERY

U.S.L., KW-15-A, 6 volts. Positive Terminal Grounded
Starting Capacity—127 amps. for 20 minutes.
Lighting Capacity—5.8 amps. for 20 hours.
Box—Length, 10-7/32; width, 7 1/8; height, 9 1/8 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4033

Connection to Engine—Bendix Drive, Type L11X-10.
Running Free—46 amps. at 5.5 volts, 4020 R.P.M.
Cranking Engine—160 to 170 amps. at 6 volts.
Lock Torque—17 pound-feet, 520 amps. at 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Auto-Lite, MAB-2079-A, mounted on starter.
Switch should not close with less than 4 lbs. pull applied at right angles to hole in extreme end of lever.
Armature—Auto-Lite, MAB-2047.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IKG-4004

Breakers—Contact separation .020 inch, or 19 cam degrees.
Contact Spring Tension—22 to 26 oz. on each.
Synchronizing—Adjust both breakers to open simultaneously.
Timing—IMPORTANT! Time ignition in full advance position.
With No. 1 piston on compression stroke, slowly turn engine until the mark "IGN" (the first line) on front vibration dampener is directly under pointer on timing chain cover. With rotor ends under No. 1 Dist. Cap Terminals, both sets of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using special attachment for adapter No. 113 and rod No. 37. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .072 inch before T.D.C., as indicated on Gauge. With rotor ends under No. 1 Dist. Cap Terminals, both sets of breaker points should just open.
Spark Plugs—14-MM (AC type K-12); Gap .020 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—20 degrees (on Flywheel).
Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	Start	200	Start
800	4	400	2
1200	8	600	4
1600	12	800	6
2000 (Max.)	16	1000	8

Ignition Coils—Auto-Lite, CE-4402.

Ignition Switch—Oakes Steering Post and Ignition Lock.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAR-4025, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	500	6.5	10	1000	7.8
2	550	6.9	16	1300	8.1
6	1000	7.3	18	1450 (Max.)	8.3

Motoring Freely—5 1/2 amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 6 volts.

Field Test—5 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps. (type 1A-7 1/2).

Brush Spring Tension—22 to 25 oz. on main; 31 to 34 on third.

Armature—Auto-Lite, GAR-2214.

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-C.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

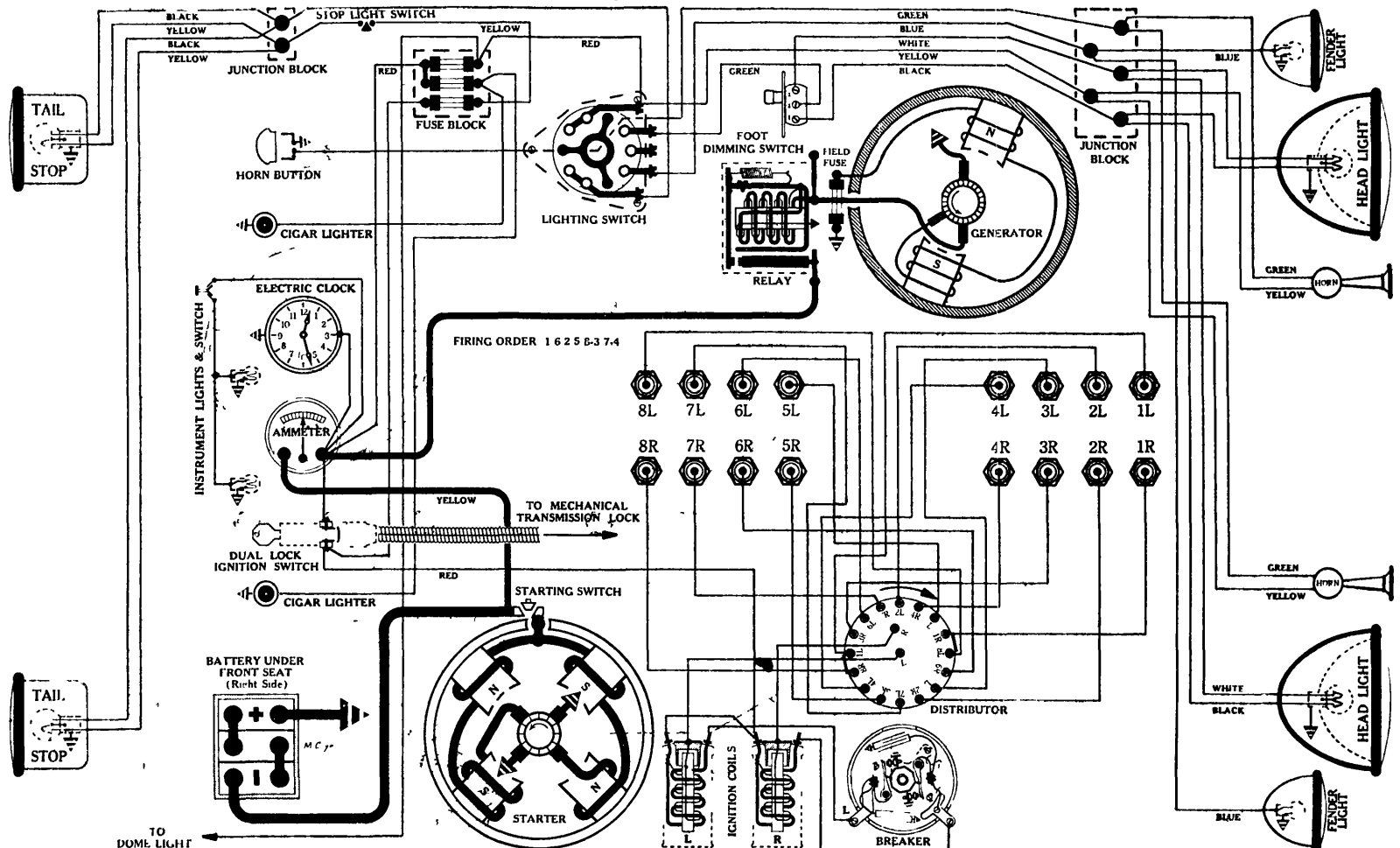
Foot Dimming Switch—Delco-Remy, 465-Z.

Fuses—Two 20 amp. fuses (type 3A-20), mounted on dash, left side, under hood.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; FENDER—63; DOME—64; INSTRUMENT—63; STOP AND TAIL—1158.

NASH

Model 1190, Twin Ignition Ambassador Eight, (1933)



BATTERY

Exide, 3-MXC-17-1, 6 volts. Positive Terminal Grounded
Starting Capacity—152 amps. for 20 minutes.
Lighting Capacity—6.6 amps. for 20 hours.
Box—Length, 11-11/16; width, 7; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4024

Connection to Engine—Bendix Drive, Type R10XD.
Running Free—46 amps. at 5.5 volts, 4020 R.P.M.
Cranking Engine—160 to 170 amps. at 6 volts.
Lock Torque—17 pound-feet, 520 amps. at 3 volts.
Brush Spring Tension—44 to 48 oz. on each.
Starting Switch—Auto-Lite, MAB-2079-S, mounted on starter.
Switch should not close with less than 4 lbs. pull applied at right angles to hole in extreme end of lever.
Armature—Auto-Lite, MAB-2073.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGK-4001

Breakers—Contact separation .020 inch, or 19 cam degrees.
Contact Spring Tension—22 to 26 oz. on each.
Synchronizing—Adjust both breakers to open simultaneously.
Timing—IMPORTANT! Time ignition in full advance position
With No. 1 piston on compression stroke, slowly turn engine until the mark "IGN" (the first line) on front vibration dampener is directly under pointer on timing chain cover. With rotor ends under No. 1 Dist. Cap Terminals, both sets of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 33. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .077 inch before T.D.C., as indicated on Gauge. With rotor ends under No. 1 Dist. Cap Terminals, both sets of breaker points should just open.
Spark Plugs—18-MM (AC type J-9); Gap .020 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—38 degrees (on Flywheel).
Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
400	Start	200	Start
800	4	400	2
1200	8	600	4
1600	12	800	6
2000 (Max.)	16	1000	8

Ignition Coils—Auto-Lite, CE-4402.

Ignition Switch—Delco-Remy, 425-S, "Dual Lock". (Combination Ignition Switch and Mechanical Transmission Lock.)

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAR-4205, (Belt Drive)

Performance Data—Gen. Cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	500	6.5	10	1000	7.8
2	550	6.9	16	1300	8.1
6	800	7.3	18	1450 (Max.)	8.3

Motoring Freely—5 1/2 amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 6 volts.

Field Test—5 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps. (type 1A-7 1/2).

Brush Spring Tension—22 to 25 oz. on main; 31 to 34 on third.

Armature—Auto-Lite, GAR-2214.

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4014

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-K.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

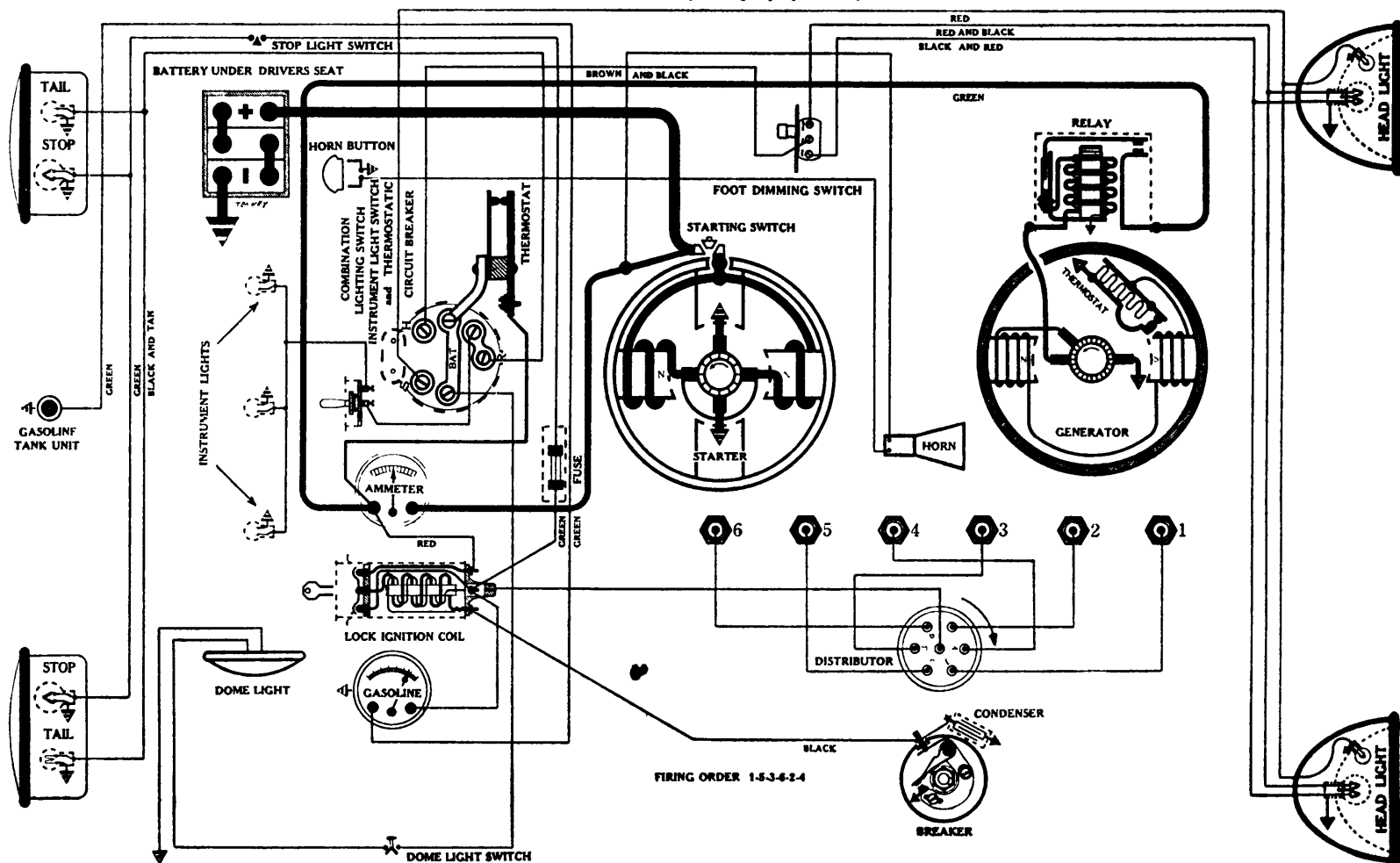
Foot Dimming Switch—Delco-Remy, 465-Z.

Fuses—Two 20 amp. fuses (type 3A-20), with spare, mounted on dash, left side, under hood.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; FENDER—63; DOME—64; INSTRUMENT—63; STOP AND TAIL—1158.

OLDSMOBILE

M d I F-33, 6 cyl., (1933)



BATTERY

Delco-Remy, 13-L, 6 volts. Negative Terminal Grounded

Starting Capacity—102 amps. for 20 minutes.

Lighting Capacity—4.3 amps. for 20 hours.

Box—Length, 9-1/16; width, 7; height, 8 5/8 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 734-K

Connection to Engine—Mechanical gear shift, incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—175 to 180 amps. at 4.5 volts.

Lock Torque—12 pound-feet, 475 amps., 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 632-P

(Full Automatic Spark Advance)

Breaker—Contact separation .022 inch, or 27 cam degrees.

Contact Spring Tension—18 to 20 oz.

Timing—NOTE:—Two marks will be found on the outside rim of the vibration dampener, and an indicating pointer is located on the front chain cover. The first mark to come under the pointer when engine is turned indicates .004 inches piston travel before T.D.C. The second mark indicates exact T.D.C., cylinders 1 and 6. With No. 1 piston coming up on compression stroke, stop when first mark is opposite pointer. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .004 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—Metric (AC type G-9); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—28 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
900	4	450	2
1300	8	650	4
2000	16	1000	8
2300	20	1150	10
3000 (Max.)	28	1500	14

Lock Ignition Coil—Delco-Remy, 534-T.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 953-S, (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	11	1000	7.9
3	700	7.	15	1200	8.1
6	800	7.1	20	1450 (Max.)	8.3

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Armature—Delco-Remy, 817807.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-Y. Combination lighting switch, overload thermostat, and instrument light switch.

Location—Behind instrument board, operated by pull knob.

Overload Thermostat—Opens when load exceeds 30 amps. Limits current flow to from 5 to 15 amps.

Fuses—Stop light circuit, Single 10 amp. fuse (type 3A-10), in tubular holder on wire, behind instrument board, near ignition coil.

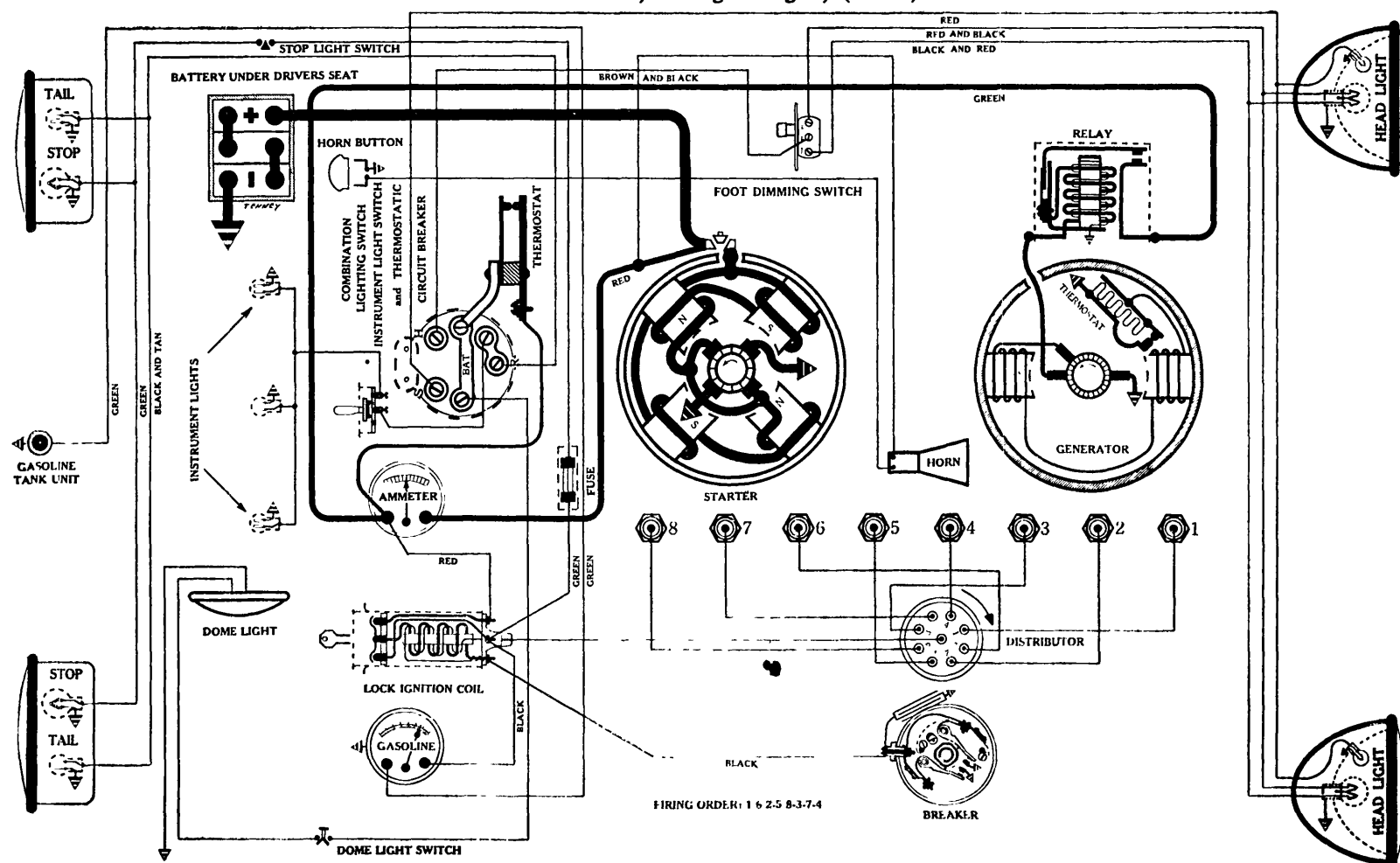
Foot Dimming Switch—Delco-Remy, 465-W.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; AUX.—63; TAIL—63; STOP—87; INSTRUMENT—63; DOME—81.

OLDSMOBILE

Model L-33, Straight Eight, (1933)



BATTERY

Delco-Remy, 13-J, 6 volts. Negative Terminal Grounded

Starting Capacity—117 amps. for 20 minutes.
Lighting Capacity—4.9 amps. for 20 hours.
Box—Length, 9-1/16; width, 7; height, 9 1/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 725-Y

• Connection to Engine—Mechanical gear shift, incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—60 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—160 to 175 amps. at 4.3 volts.
Lock Torque—15 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each.
Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 662-K
(Full Automatic Spark Advance)

Breakers—Contact separation .022 inch, or 56 cam degrees.
Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—NOTE:—Two marks will be found on the outside rim of the vibration dampener, and an indicating pointer is located on the front chain cover. The first mark to come under the pointer when engine is cranked indicates .004 inches piston travel before T.D.C. The second mark indicates exact T.D.C., cylinders 1 and 8. With No. 1 piston coming up on compression stroke stop when first mark is opposite pointer. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .004 inch before T.D.C., as indicated on gauge. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—18-MM (AC type G-9); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—26 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
900	4	450	2
1300	8	650	4
2000	16	1000	8
2300	20	1150	10
2700 (Max.)	26	1350	13

Lock Ignition Coil—Delco-Remy, 534-T.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 953-S, (Belt Drive)

Performance Data - Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	11	1000	7.9
3	700	7.	15	1200	8.1
6	800	7.1	20	1450 (Max.)	8.3

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Armature—Delco-Remy, 817807.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-Y. Combination lighting switch, overload thermostat, and instrument light switch.

Location—Behind instrument board, operated by pull knob.

Overload Thermostat—Opens when load exceeds 30 amps. Limits current flow to from 5 to 15 amps.

Fuses—Stop light circuit, Single 10 amp. fuse (type 3A-10), in tubular holder on wire, behind instrument board, near ignition coil.

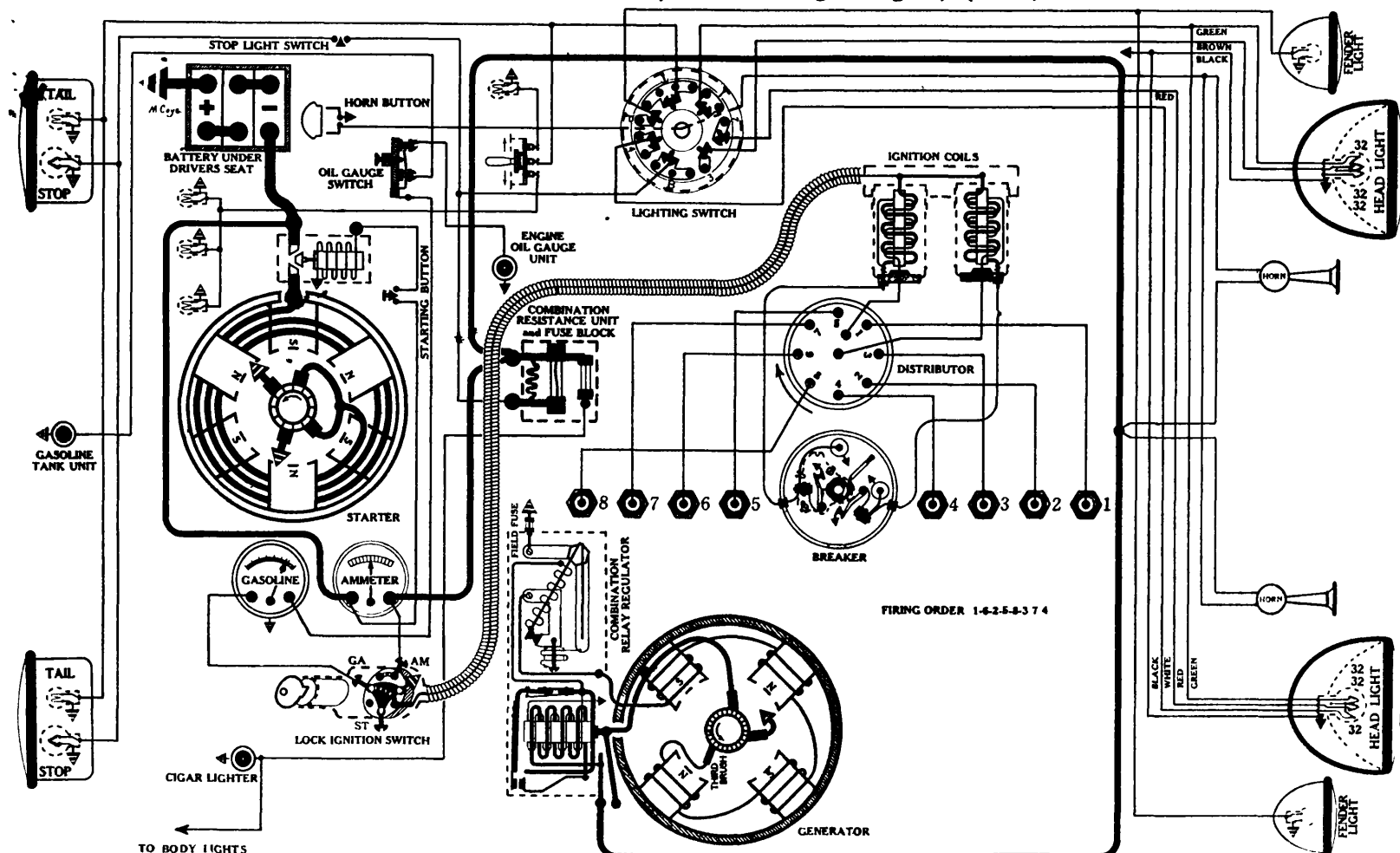
Foot Dimming Switch—Delco-Remy, 465-W.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; AUX.—63; TAIL—63; STOP—87; INSTRUMENT—63; DOME—81.

PACKARD

Models 1001 and 1002, Small Straight Eights, (1933)



BATTERY

Prest-O-Lite, A6-19-ST, 6 volts. Positive Terminal Grounded
Starting Capacity—173 amps. for 20 minutes.
Lighting Capacity—7.2 amps. for 20 hours.

Box—Length, 13; width, 7; height, 9-3/16 inches.

NOTE:—Battery under driver's seat. May be serviced by lifting cushion. To change battery, work from beneath car, first loosening carrier and then removing battery.

STARTER

Rotation, L. H., Com. End
Owen-Dyneto, Type DI-1034

Conn ction to Engine—Bendix Drive, Type R10XTD.

Running Free—60 amps. at 6 volts, 4500 R.P.M.

Cranking Engine—260 to 280 amps. at 4 volts.

Lock Torque—25 pound-feet, 650 amps. at 3½ volts.

Brush Spring Tension—26 to 28 oz. on each.

Starting Switch—Owen-Dyneto Magnetic, type 21518. Location—

On starting motor, operated by push button on instrument board.

Armature—Owen-Dyneto, 13292.

IGNITION

Rotation, R. H., Top View
North East, Type 5033450

(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch, or 56 cam degrees.

Contact Spring Tension—15 to 19 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—With No. 1 piston on compression stroke, slowly turn engine until the ninth graduation ahead of "DC" mark on vibration dampener is under pointer on timing case. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 114 and rod No. 5. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .055 inch (low compression head), .035 inch (standard compression head), or .006 inch (high compression head), before T.D.C., as indicated on GAUGE. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark plugs—14-MM (AC type K-7); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—15 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Degrees Advance (on cam)
600	Start	300
1200	7	600
1600	10	800
2000	12	1000
2800	15	1400

Coils and Lock Switch Assembly—North East, 5033449.

GENERATOR

Rotation, L. H., Com. End

Owen-Dyneto, Type CL-1005

IMPORTANT NOTE:—The drive end generator bearing is part of engine. Do not run unit in test bench until special Dyneto bearing is attached.

Performance Data—Gen. cold. Charge Regulator closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.5	12	1000	7.5
4	675	6.8	16	1350	7.9
8	800	7.2	18	1500 (Max.)	8.

Motoring Freely—3½ to 4 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—2½ amps. at 6 volts across field coils in series.

Field Fuse—3 amps. (type 1A-3), mounted in charge regulator.

Brush Spring Tension—20 to 22 oz. on each.

Armature—Owen-Dyneto, 23214.

Third Brush Adjustment—Remove cover cap. See Fig. 25, "Third Brush Adjustment" page, Sec. AA.

CHARGE REGULATOR AND RELAY

Owen-Dyneto, Type 21732

Relay Closes—6½ to 7 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.015 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—R.B.M. Mfg. Co., Type LS-600. Special Five Position "Solar" Switch, not interchangeable with previous models.

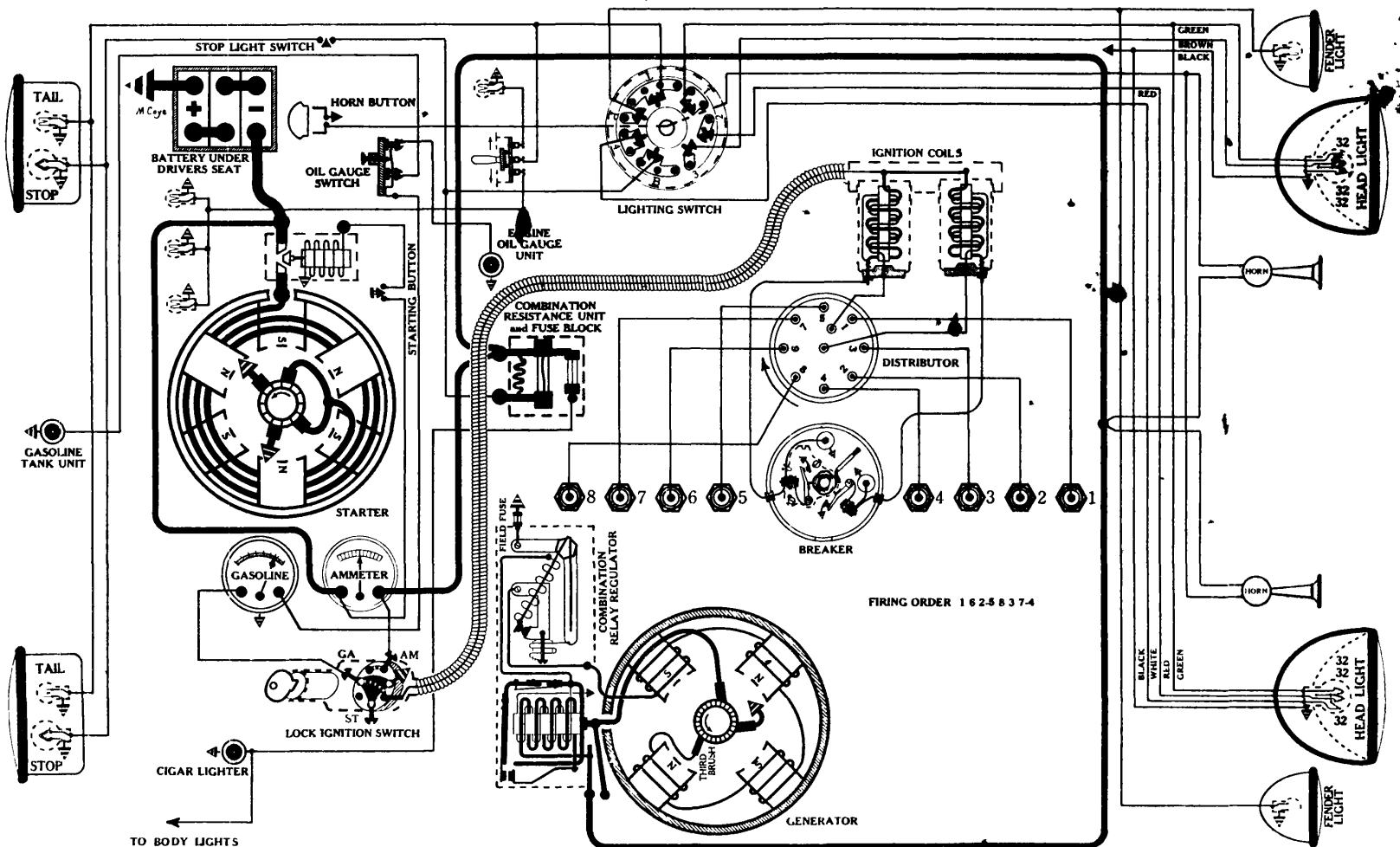
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two fuses mounted on North East Fuse Block and Resistance Assembly, No. 5030861.

Lamps—See Lamp Table, Sec. AA. HEAD—3003 (new type, triple contact, three filament, 32-32-32 C.P. bulb. Do not substitute the 1932-33 Cadillac 3001 bulb); FENDER—63; DOME—81; INSTRUMENT—63; DASH—63; STOP—87; TAIL—63.

PACKARD

Models 1003 and 1004, Super Straight Eights, (1933)



BATTERY

Prest-O-Lite, A-6-19-ST, 6 volts. Positive Terminal Grounded

Starting Capacity—173 amps. for 20 minutes.

Lighting Capacity—7.2 amps. for 20 hours.

Box—Length, 13; width, 7; height, 9-3/16 inches.

NOTE—Battery under driver's seat. May be serviced by lifting cushion. To change battery, work from beneath car, first loosening carrier and then removing battery.

STARTER

Rotation, L. H., Com. End

Owen-Dyneto, Type DN-1107

Connection to Engine—Bendix Drive, Type R10XTD.

Running Free—50 amps. at 6 volts, 3000 R.P.M.

Cranking Engine—290 to 300 amps. at 3 3/4 volts.

Lock Torque—35 pound-feet, 650 amps., 3 1/2 volts.

Brush Spring Tension—26 to 28 oz. on each.

Starting Switch—Owen-Dyneto Magnetic, type 21518. Location—

On starting motor, operated by push button on instrument board.

Armature—Owen-Dyneto, 13409.

IGNITION

Rotation, R. H., Top View

North East, Type 5033450

(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch, or 56 cam degrees.

Contact Spring Tension—15 to 19 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—With No. 1 piston on compression stroke slowly turn engine until the ninth graduation ahead of "DC" mark on vibration dampener is under pointer on timing case. With rotor under No. 1 Dist. Cap. terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 114 and rod No. 5. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .055 inch (low compression head), .035 inch (standard compression head), or .006 inch (high compression head), before I.D.C. is indicated on GAUGE. With rotor under No. 1 Dist. Cap. terminal, stationary set of breaker points should just open.

Spark plugs—14-MM (AC type K-7); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—15 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1200	7	600	3 1/2
1600	10	800	5
2000	12	1000	6
2800 (Max.)	15	1400	7 1/2

Coils and Lock Switch Assembly—North East, 5033449.

GENERATOR

Rotation, L. H., Com. End

Owen-Dyneto, Type CO-1130

IMPORTANT NOTE—The drive end generator bearing is part of engine. Do not run unit in test bench until special Dyneto bearing is attached.

Performance Data—Gen. cold. Charge Regulator closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	475	6.5	14	700	7.2
4	520	6.8	20	1000	7.5
8	575	7.	24	1500 (Max.)	8.

Motoring Freely—3 to 3 1/2 amps. at 6 volts.

Max. Stall Current—25 to 28 amps. at 6 volts.

Field Test—2.3 amps. at 6 volts across field coils in series.

Field Fuse—3 amps. (type 1A-3), mounted in charge regulator.

Brush Spring Tension—20 to 22 oz. on each.

Armature—Owen-Dyneto, 23661.

Third Brush Adjustment—Not necessary to loosen cover band. See Fig. 18, "Third Brush Adjustment" page, Sec. AA.

CHARGE REGULATOR AND RELAY

Owen-Dyneto, Type 21262

Relay Closes—6 1/2 to 7 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.015 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—R.B.M. Mfg. Co., Type LS-600. (Special Five Position "Solar" Switch, not interchangeable with previous models).

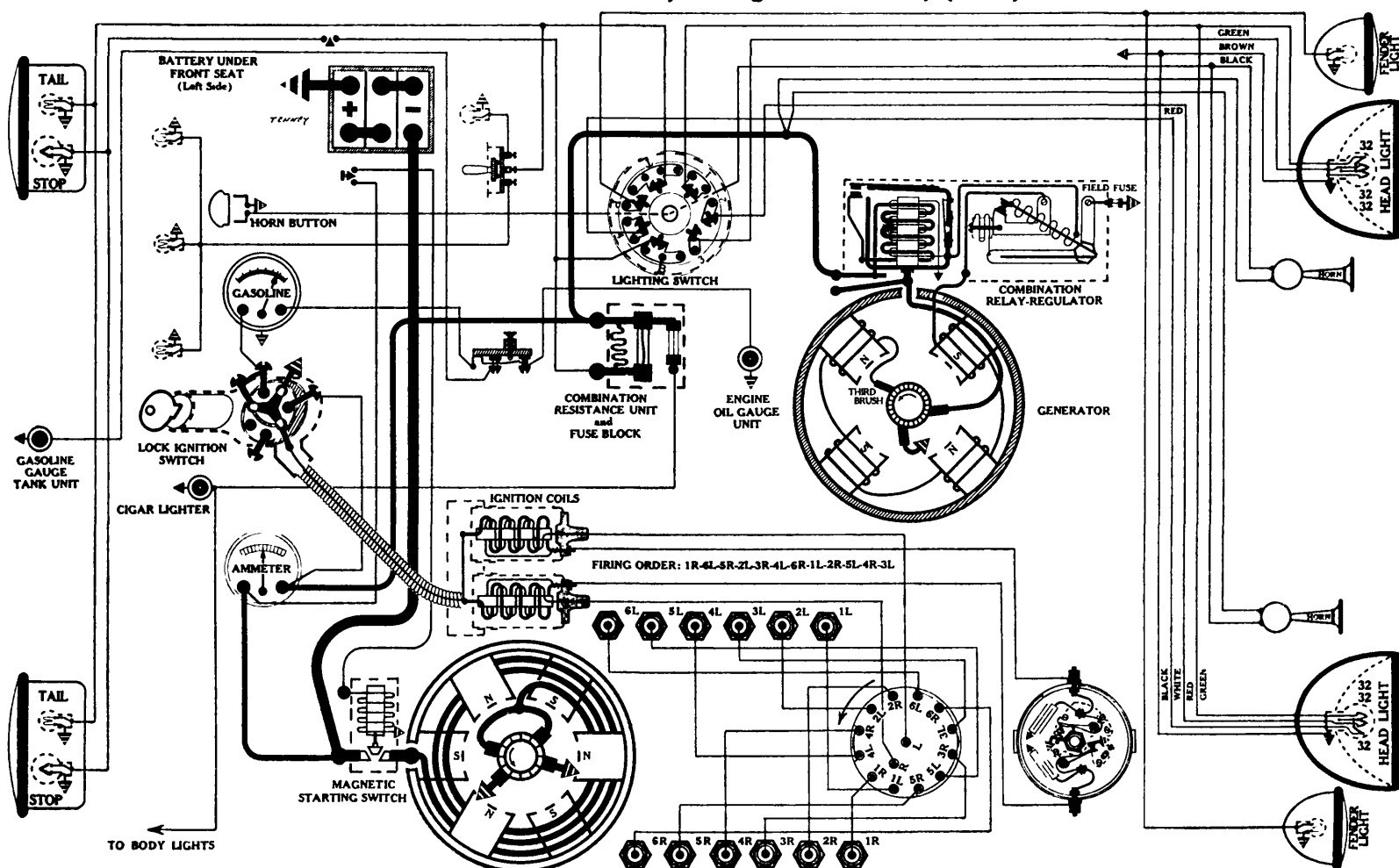
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two fuses mounted on North East Fuse Block and Resistance Assembly, No. 5030861.

Lamps—See Lamp Table, Sec. AA. HEAD—3003 (new type, triple contact, three filament, 32-32-32 C.P. bulb). Do not substitute the 1932-33 Cadillac 3001 bulb; FENDER—63; DOME—81; INSTRUMENT—63; DASH—63; STOP—87; TAIL—63.

PACKARD

Mod ls 1005 and 1006, 67 deg r e "V e" 12, (1933)



BATTERY

Prest-O-Lite, A6-19-ST, 6 volts. Positive Terminal Grounded

Starting Capacity—173 amps. for 20 minutes.

Lighting Capacity—7.2 amps. for 20 hours.

Box—Length, 13; width, 7; height, 9-3/16 inches.

NOTE:—Battery under driver's seat. May be serviced by lifting cushion. To change battery, work from beneath car, first loosening carrier and then removing battery.

STARTER

Rotation, L. H., Com. End
Owen-Dyneto, Type DN-1072

Connection to Engine—Bendix Drive, Type R10XTD.

Running Free—50 amps. at 6 volts, 3000 R.P.M.

Cranking Engine—290 to 300 amps. at 3 3/4 volts.

Lock Torque—35 pound-feet, 650 amps., 3 1/2 volts.

Brush Spring Tension—26 to 28 oz. on each.

Starting Switch—Owen-Dyneto Magnetic, type 21518. Location—

On starting motor, operated by push button on instrument board.

Armature—Owen-Dyneto, 13409.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGO-4001
(Full Automatic Spark Advance)

Breakers—Contact separation .018 inch, or 19 cam degrees.

Contact Spring Tension—20 to 22 oz. on each.

Synchronizing—Unequal intervals of 33 1/2-26 1/2-33 1/2, etc., degrees between interruptions.

Timing—With No. 1R piston on compression stroke, slowly turn engine until the seventh graduation ahead of "1R-UDC" mark on vibration dampener is under pointer on timing case. With rotor under No. 1R Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1R spark plug, and attach MOTOR GAUGE, using adapter No. 114 and rod No. 5. Slowly turn engine until No. 1R piston is coming up on compression stroke. Stop when .017 inch (equivalent to 7° advance on flywheel) before T.D.C., as indicated on Gauge. With rotor under No. 1R Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—14-MM (AC type K-7); Gap .025 to .030 inch.

Firing Order—1R-6L-5R-2L-3R-4L-6R-1L-2R-5L-4R-3L.

Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
780	4	390	2
1100	8	550	4
1700	12	850	6
2100	14	1050	7
2800 (Max.)	16	1400	8

Coils and Lock Switch Assembly—Auto-Lite, CE-4020.

GENERATOR

Rotation, L. H., Com. End
Owen-Dyneto, Type CO-1119, (Belt Drive)

Performance Data—Gen. cold. Charge Regulator closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	475	6.5	14	700	7.2
4	520	6.8	20	1000	7.5
8	575	7.	24	1500 (Max.)	8.

Motoring Freely—3 to 3 1/2 amps. at 6 volts.

Max. Stall Current—25 to 28 amps. at 6 volts.

Field Test—2.3 amps. at 6 volts across field coils in series.

Field Fuse—3 amps. (type 1A-3), mounted in charge regulator.

Brush Spring Tension—20 to 22 oz. on each.

Armature—Owen-Dyneto, 23566.

Third Brush Adjustment—Not necessary to loosen cover band.

See Fig. 18, "Third Brush Adjustment" page, Sec. AA.

CHARGE REGULATOR AND RELAY

Owen-Dyneto, Type 21262

Relay Closes—6 1/2 to 7 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.015 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—R.B.M. Mfg. Co., Type LS-600. Special Five Position "Solar" Switch, not interchangeable with previous models.

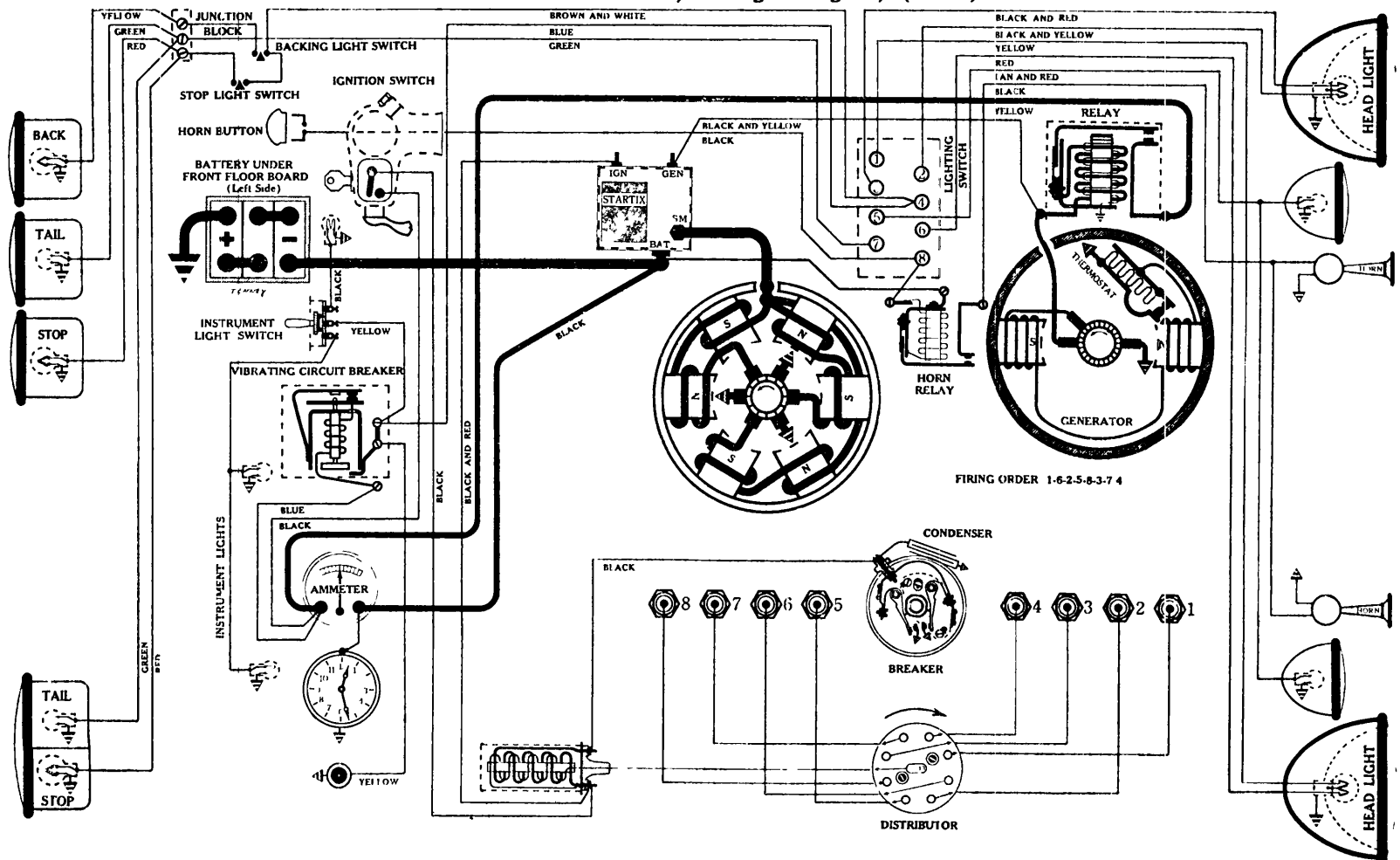
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two fuses; mounted on North East Fuse Block and Resistance Assembly, No. 5030861.

Lamps—See Lamp Table, Sec. AA. HEAD—3003 (new type, triple contact, three filament, 32-32-32 C.P. bulb. Do not substitute the 1932-33 Cadillac 3001 bulb); FENDER—63; DOME—81; INSTRUMENT—63; DASH—63; STOP—87; TAIL—63.

PIERCE-ARROW

Models 836 and 839, Straight Eights, (1933)



BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded
Starting Capacity—160 amps. for 20 minutes.
Lighting Capacity—6.6 amps. for 20 hours.
Box—Length 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 497

Connection to Engine—Bendix Drive, Type R11SXT-10.
Running Free—70 amps. at 5 volts, 3000 R.P.M.
Cranking Engine—230 to 245 amps. at 4.1 volts.
Lock Torque—19 pound-feet, 500 amps. at 3 volts.
Brush Spring Tension—36 to 40 oz. on each.
Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.
Armature—Delco-Remy, 1843420.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 662-J

Breakers—Contact separation .020 inch, or 56 cam degrees.
Contact Spring Tension—17 to 21 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Timing—IMPORTANT! Time ignition in full advance position.
Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "IGN-1-8" (found 8 degrees or 2½ flywheel teeth ahead of T.D.C. mark) is directly in line with pointer at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .025 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—¾ inch (Champion type C-4); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—33 degrees (on Flywheel).
Automatic Advance—18 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
300	Start	150	Start
600	2	300	1
1200	6	600	3
2150	12	1075	6
3100 (Max.)	18	1550	9

Ignition Coil—Delco-Remy, 537-E.

Ignition Switch—Oakes Steering Post and Ignition Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-V

Performance Data		Gen. cold. Thermostat closed.	
Amps.	R.P.M.	Volts	Amps.
0	575	6.5	12
5	800	7.1	16
9	1000	7.5	20
			1700 (Max.)

Motoring Freely—3 to 3½ amps. at 6 volts.

Max. Stall Current—19 to 21 amps. at 6 volts

Field Test—2 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1839078.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch. contacts closed.

LIGHTING

Switch—Delco Remy, 487-C (Special Five Position "Multi-Beam" Switch, not interchangeable with previous models).

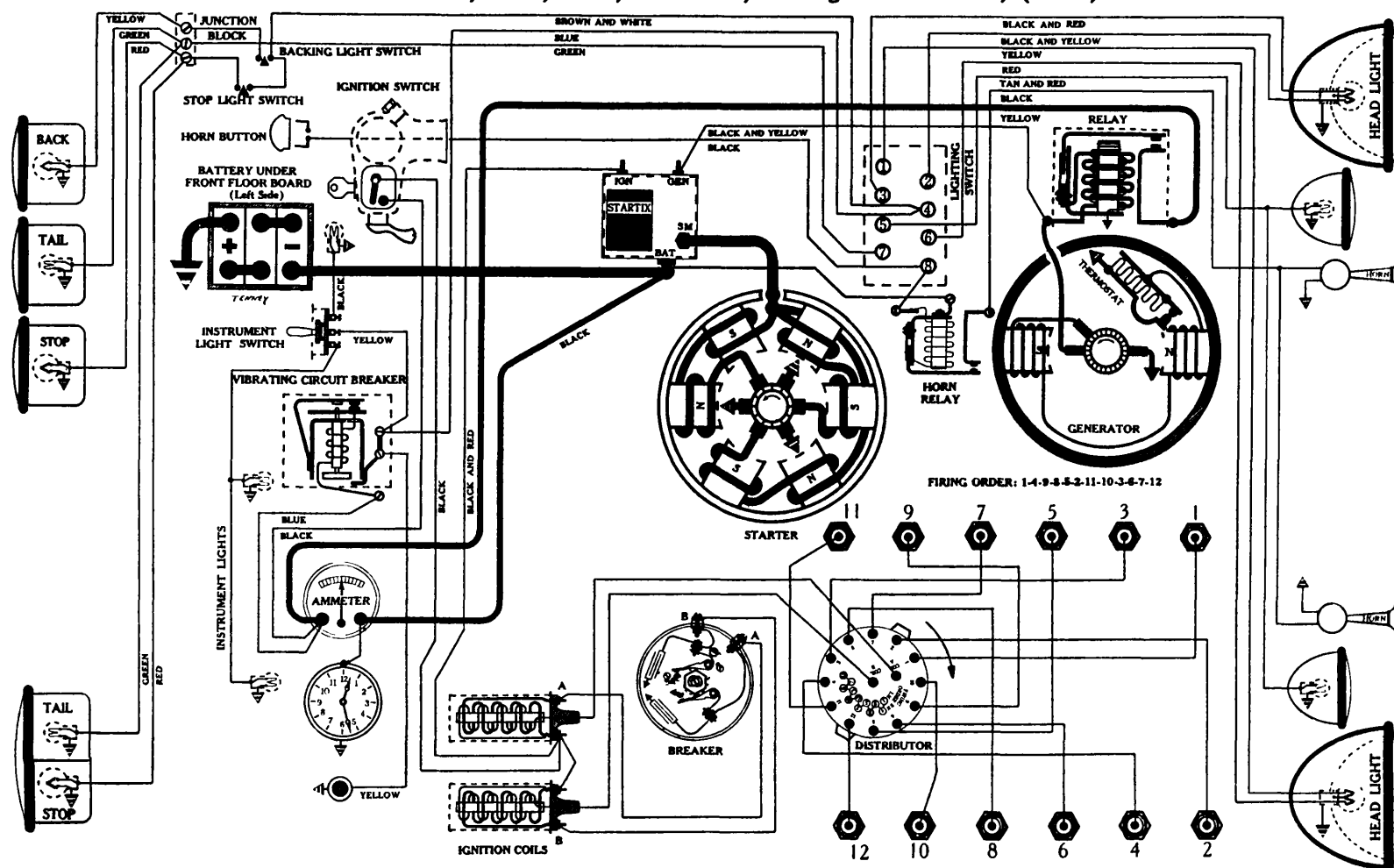
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410F. Starts 30 to 35 amps. Operates 5 to 18 amps.

Lamps—See Lamp Table Sec. AA. HEAD—1000; AUX.—81; INSTRUMENT—63; DOME—81; TAIL—81; STOP—1129.

PIERCE-ARROW

Models 1236, 1239, 1242, and 1247, 80 d gre "Vee" 12, (1933)



BATTERY

Willard, W H-5-19, 6 volts. Positive Terminal Grounded

Starting Capacity—180 amps. for 20 minutes.

Lighting Capacity—7.6 amps. for 20 hours.

Box—Length, 13; width, 7-1/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 498

Connection to Engine—Bendix Drive, Type R11SXT-10.

Running Free—70 amps. at 5 volts, 3000 R.P.M.

Cranking Engine—230 to 245 amps. at 4.1 volts.

Lock Torque—19 pound-feet, 500 amps. at 3 volts.

Brush Spring Tension—36 to 40 oz. on each.

Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.

Armature—Delco-Remy, 1843420.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 4105

Breakers—Contact separation .018 inch, or 18 cam degrees.

Contact Spring Tension—17 to 21 oz. on each.

Synchronizing—Movable points open 20 degrees after stationary.

Unequal intervals of 20-40-20, etc. degrees between interruptions.

Timing—IMPORTANT! Time ignition in full advance position. Slowly turn engine until No. 1 piston (left bank) is coming up on compression stroke. Stop when flywheel mark "Ign. No. 1" is directly in line with pointer, at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 114 and rod No. 29. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .022 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—14-MM (AC type K-10); Gap .025 inch.

Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.

NOTE.—All odd cylinder numbers on left bank, No. 1 nearest radiator. All even numbers on right bank (see diagram).

Manual Advance—33 degrees (on Flywheel).

Automatic Advance—14 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
500	Start	250	Start
800	2	400	1
1500	6	750	3
2100	10	1050	5
2800 (Max.)	14	1400	7

Ignition Coils—Delco-Remy, 537-E.

Ignition Switch—Oakes Steering Post and Ignition Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-V

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	12	1200	7.8
5	800	7.1	16	1600	8.
9	1000	7.5	20	1700 (Max.)	8.2

Motoring Freely—3 to 3 1/2 amps. at 6 volts.

Max. Stall Current—19 to 21 amps. at 6 volts.

Field Test—2 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each.

Armature—Delco-Remy, 1839078.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 487-C (Special Five Position "Multi-Beam" Switch, not interchangeable with previous models).

Location—Foot of steering column. Lights controlled by lever on steering wheel.

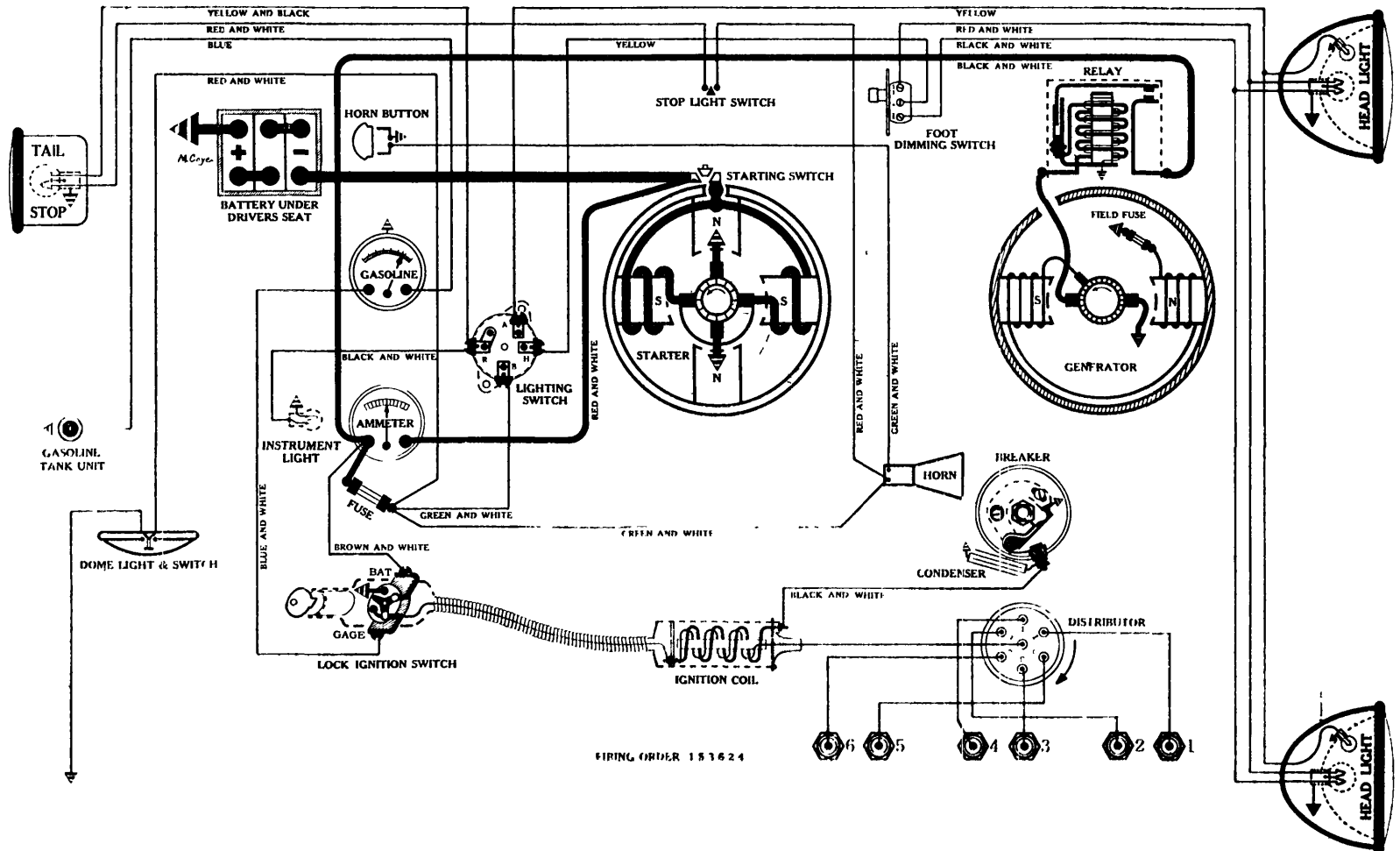
Vibrating Circuit Breaker—Delco-Remy, 410-F. Starts 30 to 35 amps. Operates 5 to 18 amps.

Horn Relay—Klaxon, 266-T.

Lamps—See Lamp Table, Sec. AA. HEAD—1000; AUX.—81; INSTRUMENT—63; DOME—81; TAIL—81; STOP—1129.

PLYMOUTH

Model PC, 6 cyl., (Early 1933)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded
(If radio equipped, Battery, Willard, WT-1-15. For data see
Plymouth, PC, Late 1933)

Starting Capacity—105 amps. for 20 minutes.

Lighting Capacity—4.3 amps. for 20 hours.

Box—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 734-H

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—165 to 180 amps. at 4.2 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 622-H

(Full Automatic Spark Advance)

Breaker Contact separation .020 inch, or 26 cam degrees.

Contact Spring Tension—17 to 21 oz.

Timing—Remove inspection cover plate, located on left side of flywheel housing, directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "DC" coincides with "Ign. 10°" pointer on timing indicator plate. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove the 1/8 inch pipe plug (located above No. 6 piston), and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12, or remove No. 1 spark plug and attach Gauge, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .039 inch before T.D.C. (standard head), or .025 inch before T.D.C. (red head), as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-12), Standard Head; Gap .025 inch.

14-MM (AC type K-10), Red Head; Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—18 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1500	8	750	4
2200	16	1100	8
2400 (Max.)	18	1200	9

Coil and Lock Switch Assembly—Delco-Remy, 537-W (on cars up to No. 1771873).

GENERATORS

Rotation, L. H., Com. End

Delco-Remy, 943-S or 937-E, (Belt Drive)

(For 937-E Data see Late 1933 Plymouth, Model PC)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	800	6.5	12	1250	7.5
4	900	6.8	16	1600	8.1
8	1050	7.1	17	2300 (Max.)	8.3

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 4 1/2 volts.

Field Test—3 1/2 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (Type 7A-5).

NOTE—943 S Generators above Serial No. 30,000 equipped with field fuse

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1858448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens 0 to 2 1/2 amps. discharge.

Contact Gap .015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Chrysler, No. 393290 (small round type).

Location—Behind instrument board.

Fuses—Single 20 amp. fuse (type 3A-20) mounted below ammeter, behind instrument board.

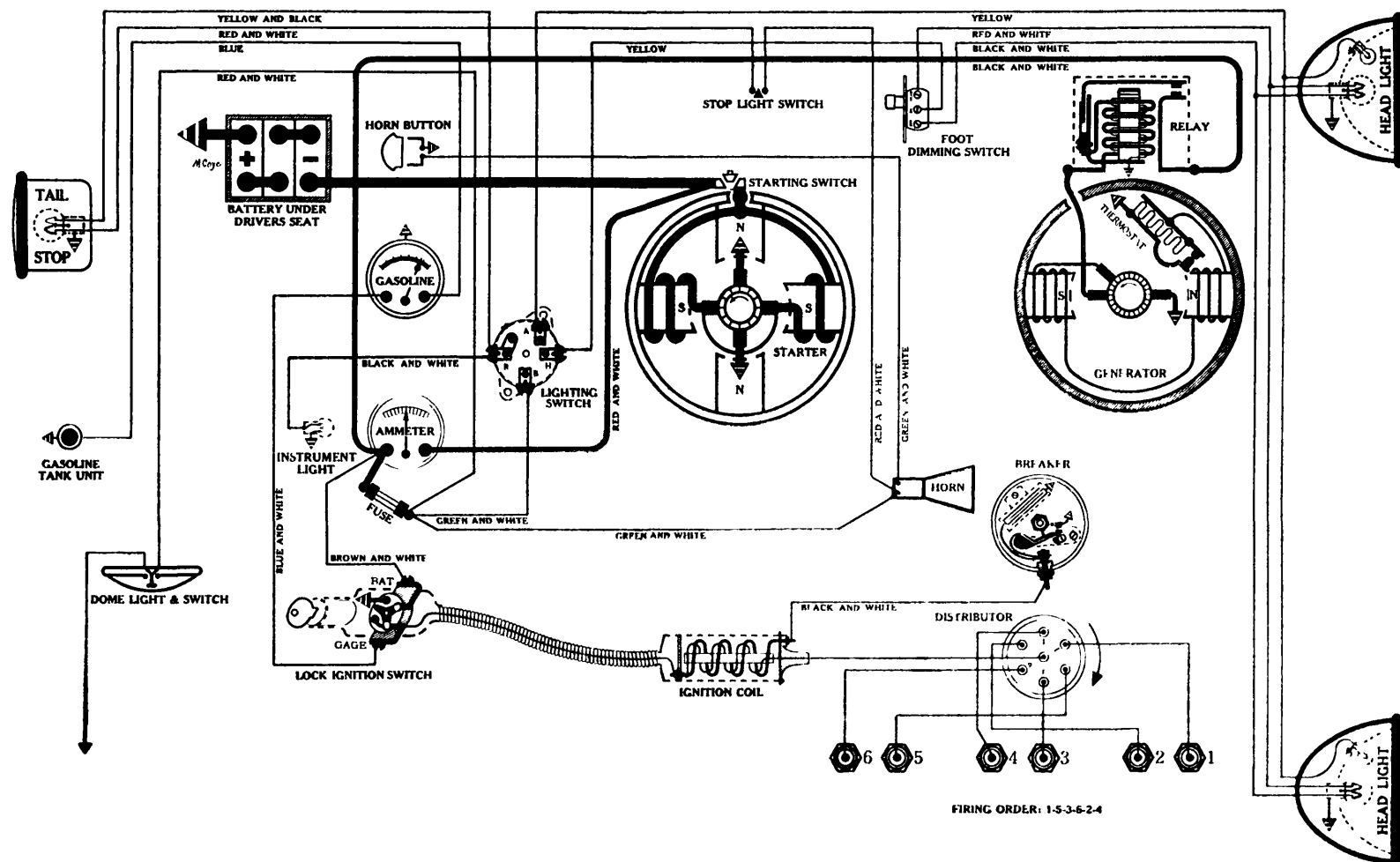
Foot Dimming Switch—Delco-Remy, 465-Z.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; AUX.—63; INSTRUMENT—63; DOME—87; STOP AND TAIL—1158.

PLYMOUTH

Model PC and PC D Lux 112 inch W. B., (Lat 1933)



BATTERY

Willard, WT-1-15, 6 volts. Positive Terminal Grounded
(If no radio, Battery, Willard, WS-1-13. For data see Plymouth PC, Early 1933)

Starting Capacity—117 amps. for 20 minutes.

Lighting Capacity—4.5 amps. for 20 hours.

Box—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 734-H

Connection to Engine—Mechanical Gear Shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—165 to 180 amps. at 4.2 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 644-H
(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch, or 25 cam degrees.

Contact Spring Tension—17 to 21 oz.

Timing—Remove inspection cover plate, located on left side of flywheel housing, directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "DC" coincides with "DC" mark on timing indicator plate. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove the 3/8 inch pipe plug (located above No. 6 piston), and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12, or remove No. 1 spark plug and attach Gauge, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C. (standard head), or .002 inch after T.D.C. (red head), as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-12), Standard Head; Gap .025 inch.

14-MM (AC type K-10), Red Head; Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—28 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
450	Start	225	Start
500	2	250	1
660	8	330	4
800	14	400	7
1500	20	750	10
1940	24	970	12
2400 (Max.)	28	1200	14

Coil and Lock Switch Assembly—Delco-Remy, 537-T (on cars after Serial No. 1771873).

GENERATORS

Rotation, L. H., Com. End
Delco-Remy, 937-E or 943-S, (Belt Drive)
(For 943-S Data see Early 1933 Plymouth, Model PC)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	15	1300	7.8
5	950	6.8	20	1600	8.4
10	1100	7.2	24	2400 (Max.)	8.5

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 5.5 volts.

Field Test—3½ amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7½ volts.

Opens 0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Chrysler, No. 393290 (small round type).

Location—Behind instrument board.

Fuses—Single 20 amp. fuse (type 3A-20) mounted below ammeter, behind instrument board.

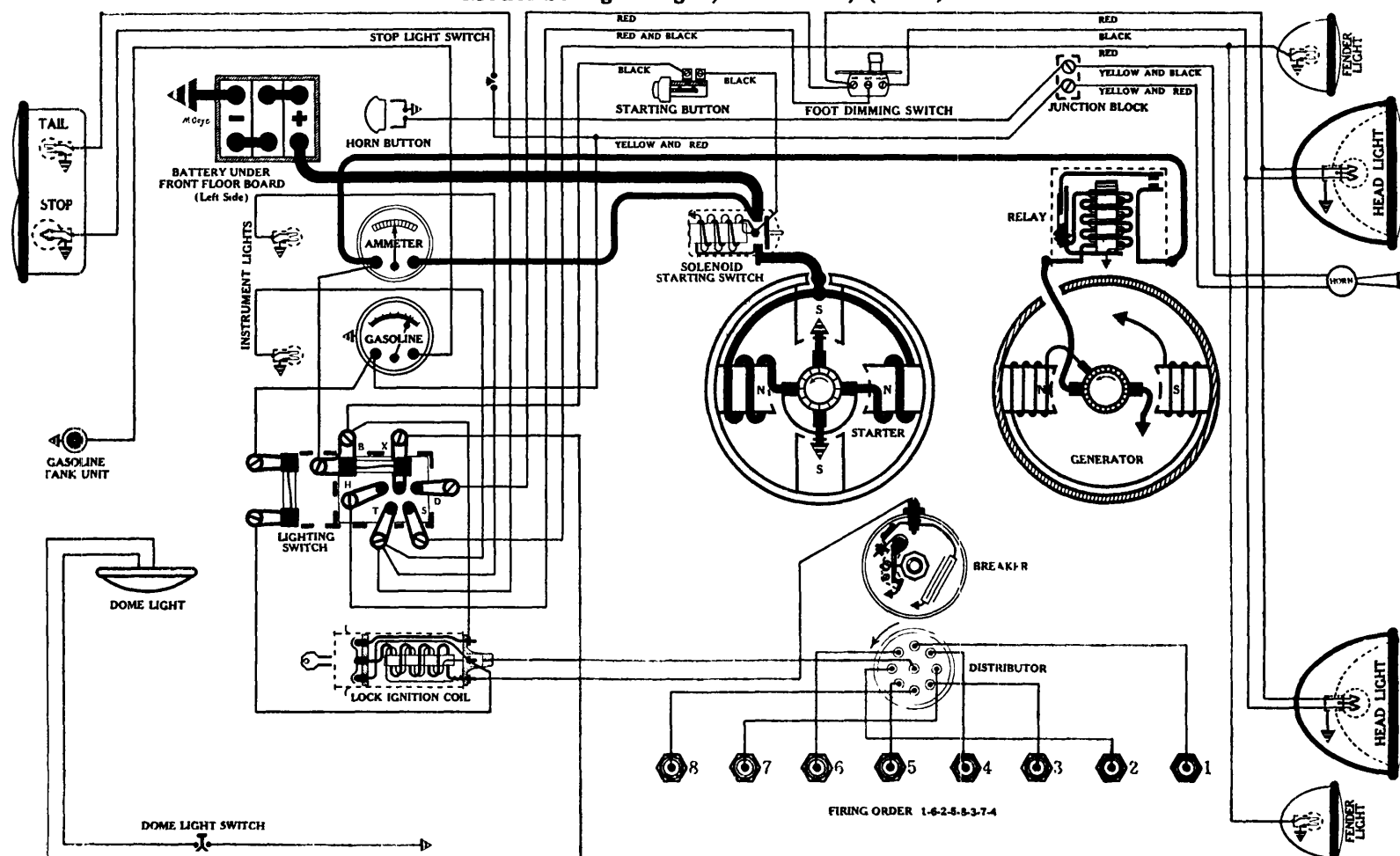
Foot Dimming Switch—Delco-Remy, 465-Z.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; AUX.—63; INSTRUMENT—63; DOME—87; STOP AND TAIL—1158.

PONTIAC

Model Straight Eight, Series 601, (1933)



BATTERY

Delco-Remy, 15-K, 6 volts. Negative Terminal Grounded
 Starting Capacity—115 amps. for 20 minutes.
 Lighting Capacity—4.7 amps. for 20 hours.
 Box—Length, 9-1/16; width, 7; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 734-G

Connection to Engine—Bendix Drive, Type A-1569.
 Running Free—65 amps. at 5 volts, 5000 R.P.M.
 Lock Torque—12 pound-feet, 475 amps., 3.6 volts.
 Brush Spring Tension—24 to 28 oz. on each.
 Starting Switch—Delco-Remy Solenoid, 1503.
 Push Button Starting Control Switch—Delco-Remy, 1379.
 Armature—Delco-Remy, 1847432.

IGNITION

Rotation, L. H., Top View
 Delco-Remy, 661-M

(Full Automatic Spark Advance)

Breaker Contact separation .016 inch, or 17 cam degrees.
 Contact Spring Tension—17 to 21 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when first flywheel mark "IGN 1 & 8" is in line with pointer on flywheel housing. (NOTE:—There are two 1 & 8 ignition marks on flywheel. The first mark is 9 degrees before T.D.C., and the second mark 4 degrees before T.D.C. The recommended setting is by the first mark, to compensate for wear.) With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 114 and rod No. 9. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .005 inch (new cars driven less than 1500 miles), or .025 inch (cars with greater mileage) before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-10), High Compression Head; Gap .025 inch.

14-MM (AC type K-12), Low Compression Head; Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—26 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1500	8	750	4
2200	14	1100	7
2900	20	1450	10
3600 (Max.)	26	1800	13

Lock Ignition Coil—Delco-Remy, 534W.

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 937-B, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	14	1000	7.9
4	640	7.1	17	1400	8.1
10	800	7.8	18	1700 (Max.)	8.2

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—21 to 23 amps. at 5.8 volts.

Field Test—3 1/2 amps. at 6 volts, across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 1843126.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-Z.

Location—Behind instrument board. Operated by pull knob.

Fuses—Lighting, 20 amp. fuse (type 3A-20), mounted on switch back. Stop Light circuit protected by 10 amp. fuse (type 3A-10) mounted on switch support.

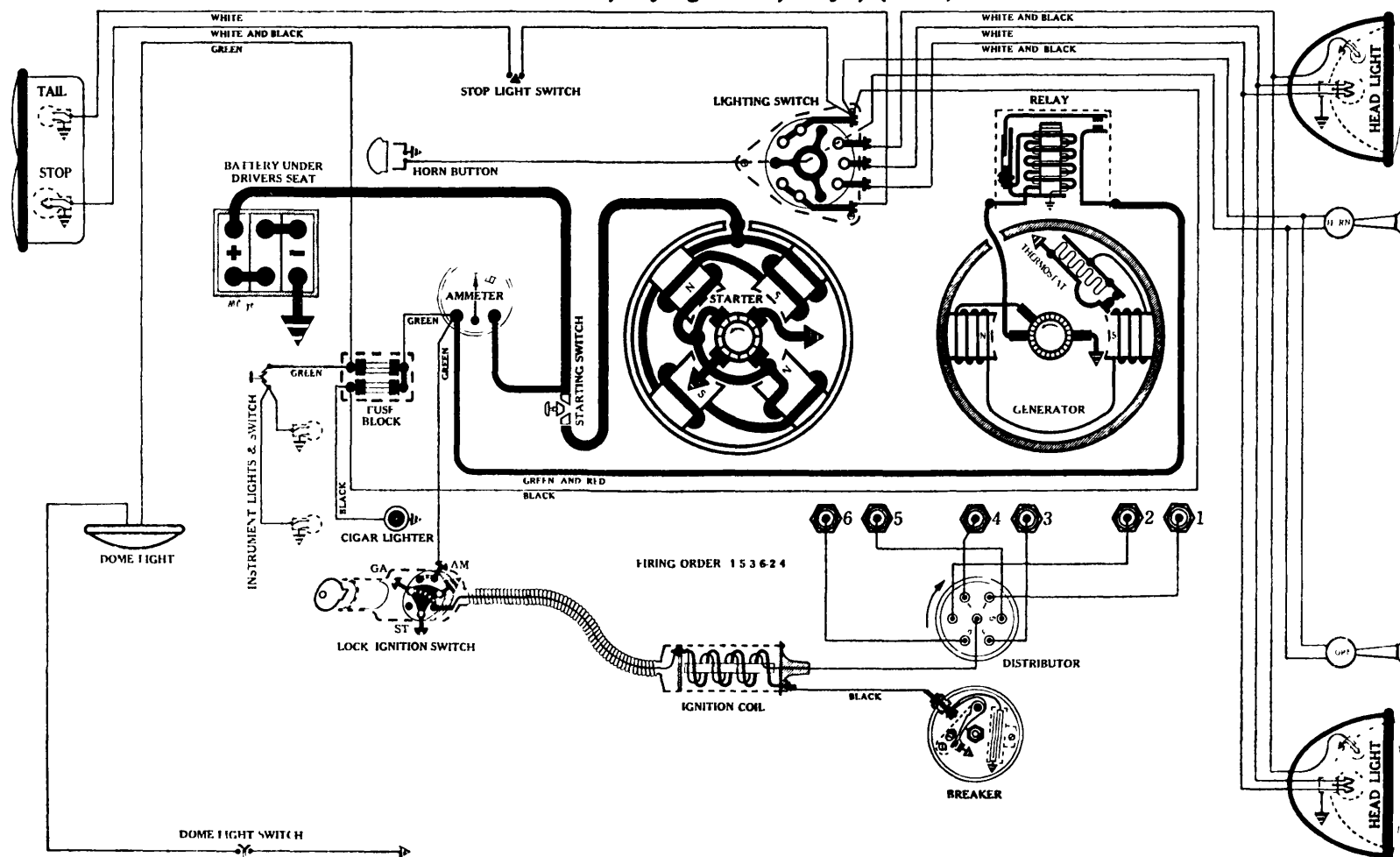
Foot Dimming Switch—Delco-Remy, 465-Z.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; FENDER—63; INSTRUMENT—63; TAIL—63; DOME—63; STOP—63.

REO

Mod 1 S2-33, Flying Cloud, 6 cyl., (1933)



BATTERY

Willard, WH-1-13, 6 volts. Negative Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Lighting Capacity—5.1 amps. for 20 hours.

Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 718-H

Connection to Engine—Bendix Drive.

Running Free—65 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—160 to 175 amps. at 4.3 volts.

Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 405-C.

Armature—Delco-Remy, 818002.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 644-M

Breaker—Contact separation .020 inch, or 26 cam degrees.

Contact Spring Tension—17 to 21 oz.

Timing—IMPORTANT! Time ignition in full advance position.

Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the line on flywheel (found 3/4 inch or 2 full teeth ahead of flywheel mark "UDC") is opposite reference line on flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .012 inch (for straight run gasoline) or .048 inch (for Ethyl gasoline) before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type C-7); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—18 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
300	Start	150	Start
600	2	300	1
900	4	450	2
2000	12	1000	6
2600	16	1300	8
2900 (Max.)	18	1450	9

Coil and Lock Switch Assembly—Delco-Remy, 536-S.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 955-R

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	11	1000	7.9
3	700	7.1	15	1200	8.1
6	800	7.1	20	1450 (Max.)	8.3

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Armature—Delco-Remy, 817807.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-X.

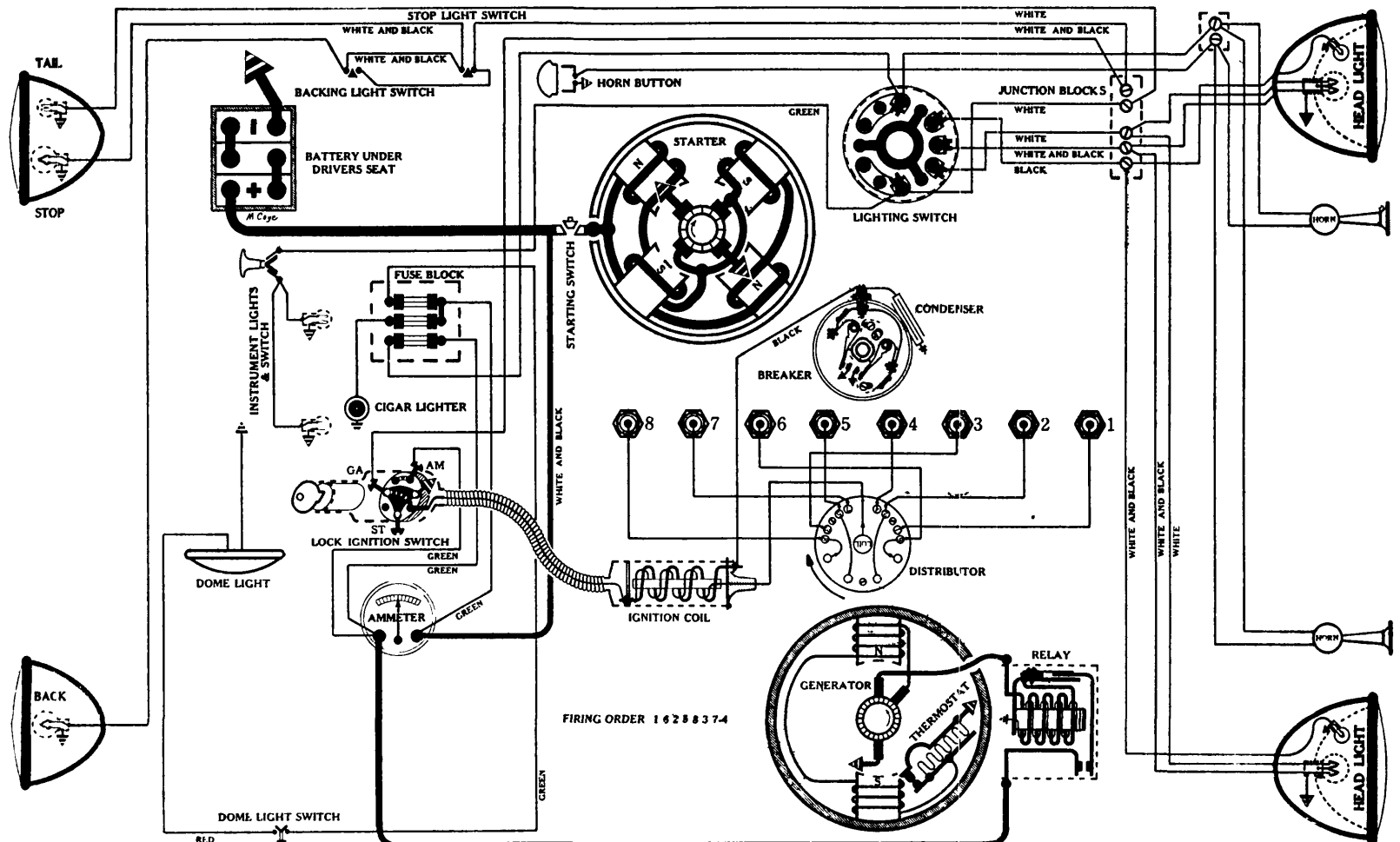
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Two 20 amp. fuses (type 3A-20), mounted on block located behind and above instruments (about center of instrument board).

Lamps—See Lamp Table, Sec. AA. HEAD—1110; AUX.—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

REO

Model N-2, Royale, Straight Eight, (1933)



BATTERY

Willard, RH-4-17, 6 volts. Negative Terminal Grounded

Starting Capacity—160 amps. for 20 minutes.

Lighting Capacity—6.8 amps. for 20 hours.

Box—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, R. H., Com. End
Delco-Remy, 728-M

Connection to Engine—Mechanical gear shift, incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor. Gear reduction job.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—160 to 180 amps. at 4½ volts.

Lock Torque—28 pound-feet, 600 amps., 3 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—Delco-Remy, 16210.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 660-K

Breakers—Contact separation .020 inch, or 56 cam degrees.

Contact Spring Tension—18 to 20 oz.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—IMPORTANT! Time ignition in full advance position. Slowly turn engine until No 1 piston is coming up on compression stroke. Stop when the line on flywheel (found ¼ inch ahead of flywheel mark "UDC") is opposite reference line on flywheel inspection hole. With rotor under No 1 Dist Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No 1 spark plug, and attach MOTOR GAUGE, using adapter No 104 and rod No 2. Slowly turn engine until No 1 piston is coming up on compression stroke. On engines using straight run gasolene stop when .014 inch before T D C. On engines using Ethyl gasoline stop when .048 inch before T D C, as indicated on Gauge. With rotor under No 1 Dist Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—18-MM (Champion type C-7); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).

Automatic Advance—22 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1200	4	600	2
1600	8	800	4
2100	12	1050	6
2500	16	1250	8
3000	20	1500	10
3200 (Max.)	22	1600	11

Coil and Lock Switch Assembly—Delco-Remy, 536-T.

GENERATOR
Rotation, L. H., Com. End
Delco-Remy, 955-G

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	11	1000	7.9
3	700	7.	15	1200	8.1
6	800	7.1	20	1450 (Max.)	8.3

NOTE—Thermostat opens about 165° F., reducing charging rate approx 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each.

Armature—Delco-Remy 820985.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY
Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 482-F.

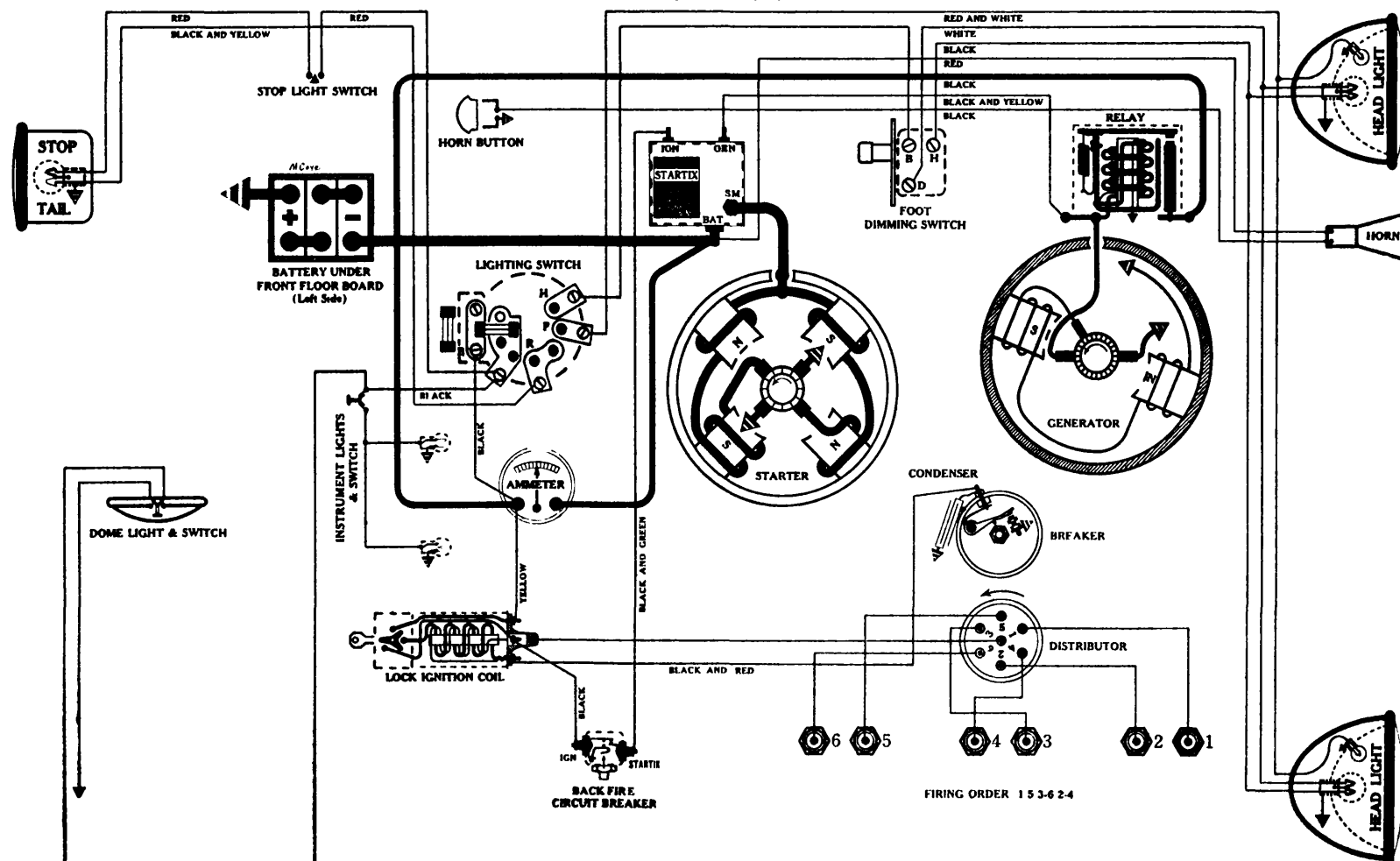
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Fuses—Three 20 amp. fuses (type 3A-20), mounted on block, located behind and above instruments (about center of instrument board).

Lamps—See Lamp Table, Sec. AA. HEAD—1116; AUX.—63; INSTRUMENT—63; DOME—63; TAIL—63; STOP AND BACK—87.

ROCKNE

Mod 1 10, 6 cyl., (1933)



BATTERY

Willard, WH-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Lighting Capacity—5.1 amps. for 20 hours.

Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAJ-4030

Connection to Engine—Bendix Drive, Type RCD10FXD-9.

Running Free—67 amps. at 5.5 volts, 4100 R.P.M.

Cranking Engine—160 to 175 amps. at 5.1 volts, 225 R.P.M.

Lock Torque—12 pound-feet, 550 amps., 3 volts.

Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device, in conjunction with "Startix" Circuit Breaker fitted to intake manifold.

Armature—Auto-Lite, MAJ-2046.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGB-4070-A

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch, or 27 cam degrees.

Contact Spring Tension—17 to 19 oz.

Timing—With No. 1 piston on compression stroke, bring flywheel mark "UDC 1-6" directly in line with pointer in flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C., as indicated on Gauge. With rotor under No. 1 Dist Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type 7); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—21 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1000	4	500	2
1200	8	600	4
1400 (Intermediate) 12		700	6
2000	16	1000	8
2800 (Max.)	21	1400	10 1/2

Lock Ignition Coil—Auto-Lite, IG-4307.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAM-4501, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.4	10	1180	7.2
2	780	6.6	14	1520	7.6
4	870	6.7	16	1860	7.8
6	960	6.9	17	2400 (Max.)	8.

Motoring Freely—4 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 amps. at 6 volts.

Brush Spring Tension—20 to 24 oz. on main; 30 to 34 oz. on third.

Armature—Auto-Lite, GAM-2055.

Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4022

Closes—7 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9236.

Location—Behind instrument board. Operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch back.

Spare fuse in clip on switch support.

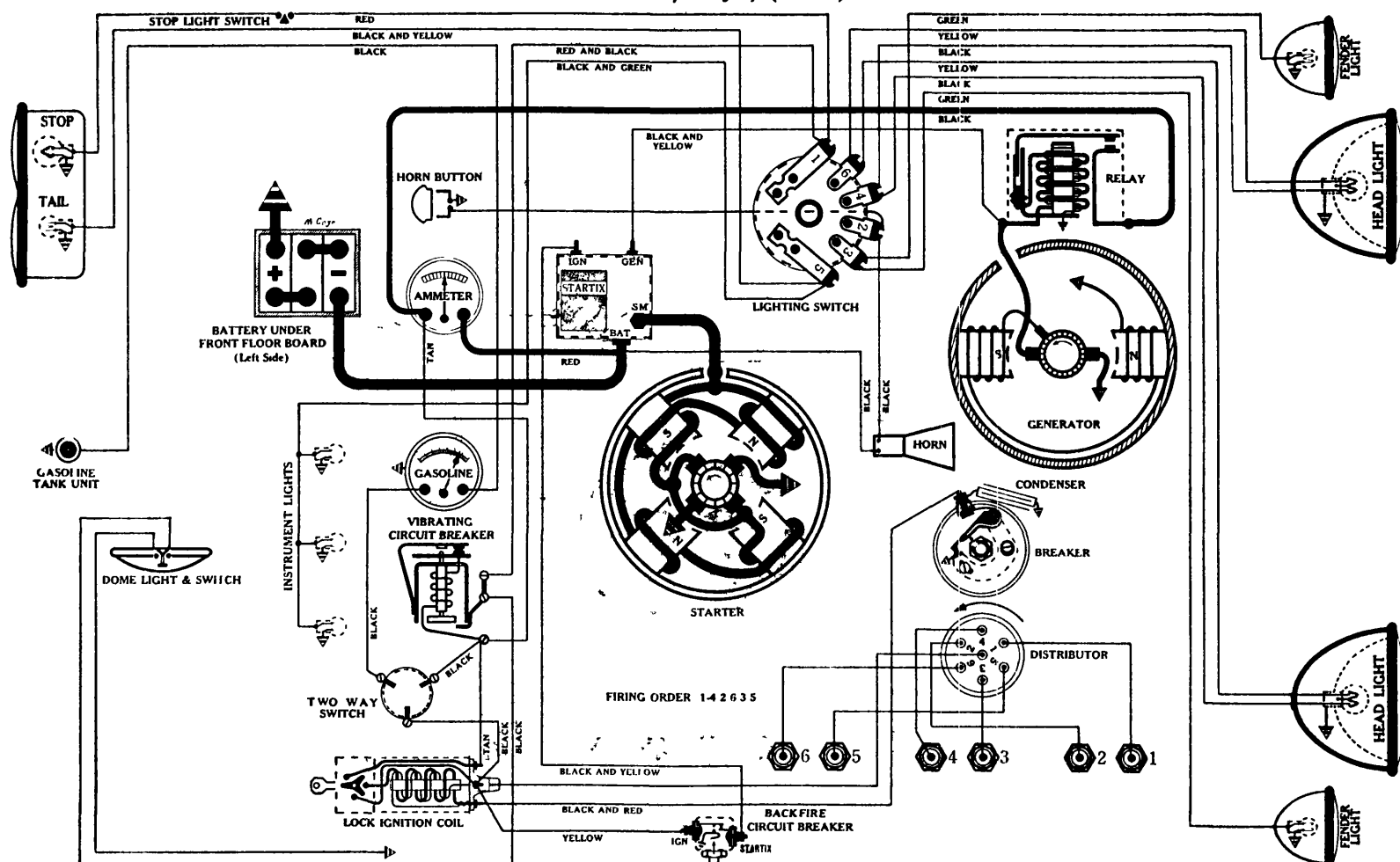
Foot Dimming Switch—Clum, No. 9126.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; AUX.—81; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

STUDEBAKER

Model 56, 6 cyl., (1933)

**BATTERY**

Willard, WH-1-13, 6 volts. Positive Terminal Grounded
 Starting Capacity—120 amps. for 20 minutes.
 Lighting Capacity—5.1 amps. for 20 hours.
 Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 718-Z

Connection to Engine—Bendix Drive, Type R10XD-9.
 Running Free—65 amps. at 5 volts, 6000 R.P.M.
 Cranking Engine—160 to 175 amps. at 4.3 volts.
 Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
 Brush Spring Tension—24 to 28 oz. on each.
 Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device, in conjunction with "Startix" Circuit Breaker fitted to intake manifold.
 Armature—Delco-Remy, 820626.

IGNITION

Rotation, L. H., Top View
 Delco-Remy, 622-A

(Semi-Automatic Spark Advance in conjunction with Delco-Remy, 680-D Vacuum Control)

Breaker—Contact separation .020 inch, or 27 cam degrees.

Contact Spring Tension—17 to 21 oz.

Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke, bring flywheel mark "UDC 1-6" directly under pointer on the right side of the flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C., as indicated on Gauge. With rotor under No. 1 Dist Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type 8); Gap .025 inch.

Firing Order—1-4-2-6-3-5.

Manual Advance—12 degrees (on Flywheel).

Vacuum Control—6 degrees (on Flywheel).

Automatic Advance—25½ degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
800	Start	400	Start
1200	4	600	2
1920	12	960	6
2500	18	1250	9
3200 (Max.)	25½	1600	12¾

Lock Ignition Coil—Delco-Remy, 537-X.

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 943-V, (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	11	1200	7.9
3	850	6.8	15	1400	8.
5	1000	7.2	17	1850 (Max.)	8.2

Motoring Freely—4 to 5 amps. at 6 volts.

Max. Stall Current—19 to 20 amps. at 6 volts.

Field Test—3½ amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on each.

Armature—Delco-Remy, 817221.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7½ volts

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9115.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

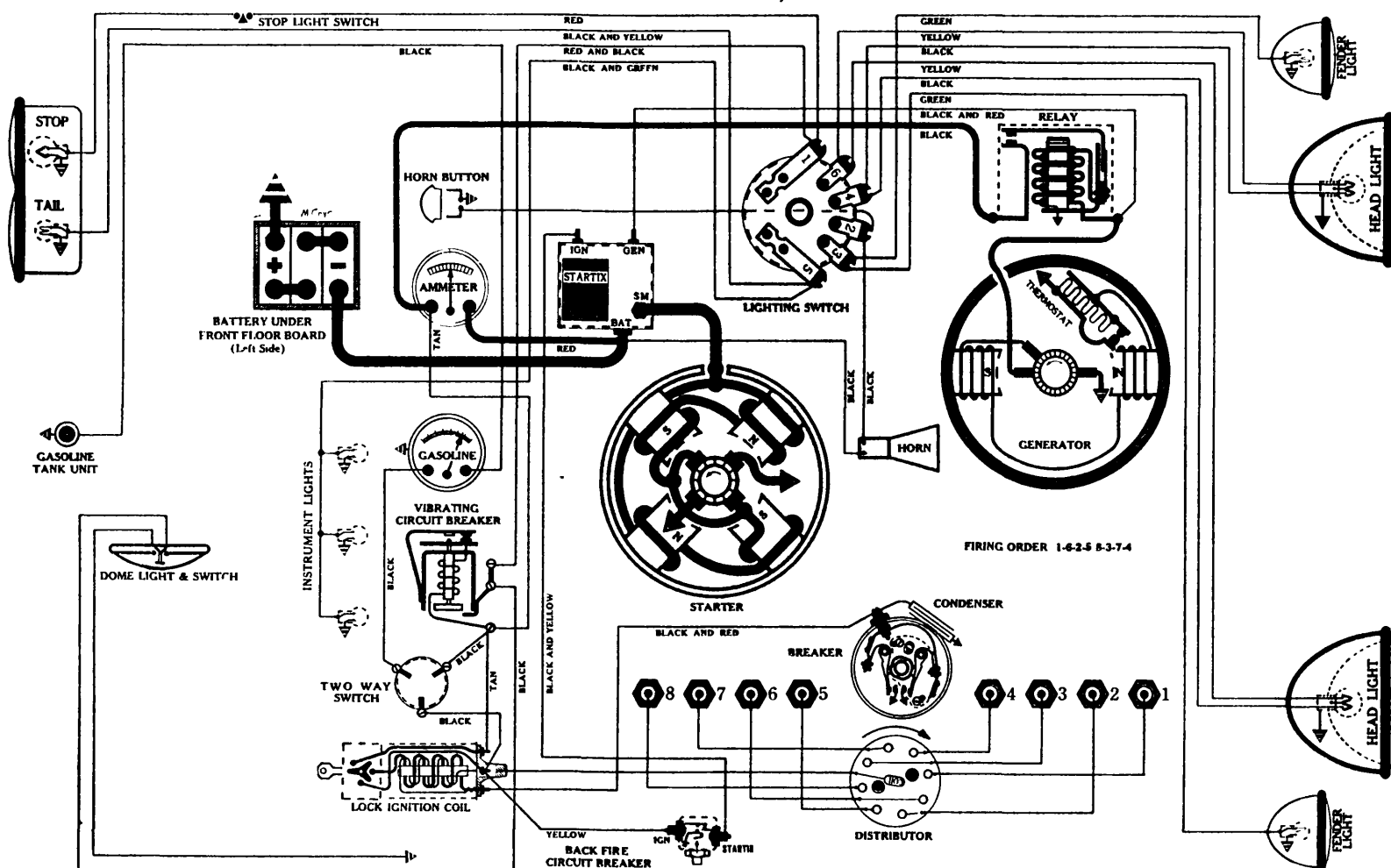
Vibrating Circuit Breaker—Delco-Remy, 410-L. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; FENDER—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

STUDEBAKER

Models 73 Commander, and 82 President, Straight Eights, (1933)

NOTE:—Wiring diagrams of 73 and 82 same, excepting instrument light switch and dome light switch used on Model 82. For circuits see Studebaker 71, 1932.



BATTERY

Willard, WH-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Lighting Capacity—5.1 amps. for 20 hours.

Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 718-Y

Connection to Engine—Bendix Drive, Type R10XD-9.

Running Free—65 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—160 to 175 amps. at 4.3 volts.

Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.

Brush Spring Tension—24 to 28 oz. on each.

Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device, in conjunction with "Startix" Circuit Breaker fitted to intake manifold.

Armature—Delco-Remy, 1838663.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 662-H

(Semi-Automatic Spark Advance in conjunction with Delco-Remy, 680-C Vacuum Control)

Breakers—Contact separation .020 inch, or 56 cam degrees.

Contact Spring Tension—17 to 21 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke, bring flywheel punch marks (found 1/2 inch before flywheel mark "UDC 1-8") directly under pointer in flywheel housing. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .023 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—18-MM (Champion type 8); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—25 degrees (on Flywheel).

Vacuum Control—6 degrees (on Flywheel).

Automatic Advance—29 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1200	6	600	3
1900	12	950	6
2500	18	1250	9
3200	24	1600	12
3600 (Max.)	29	1800	14 1/2

Lock Ignition Coil—Delco-Remy, 537-X.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-C, (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	11	1000	7.9
8	700	7.	15	1200	8.1
6	800	7.1	20	1450 (Max.)	9.3

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each.

Armature—Delco-Remy, 820370.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9115.

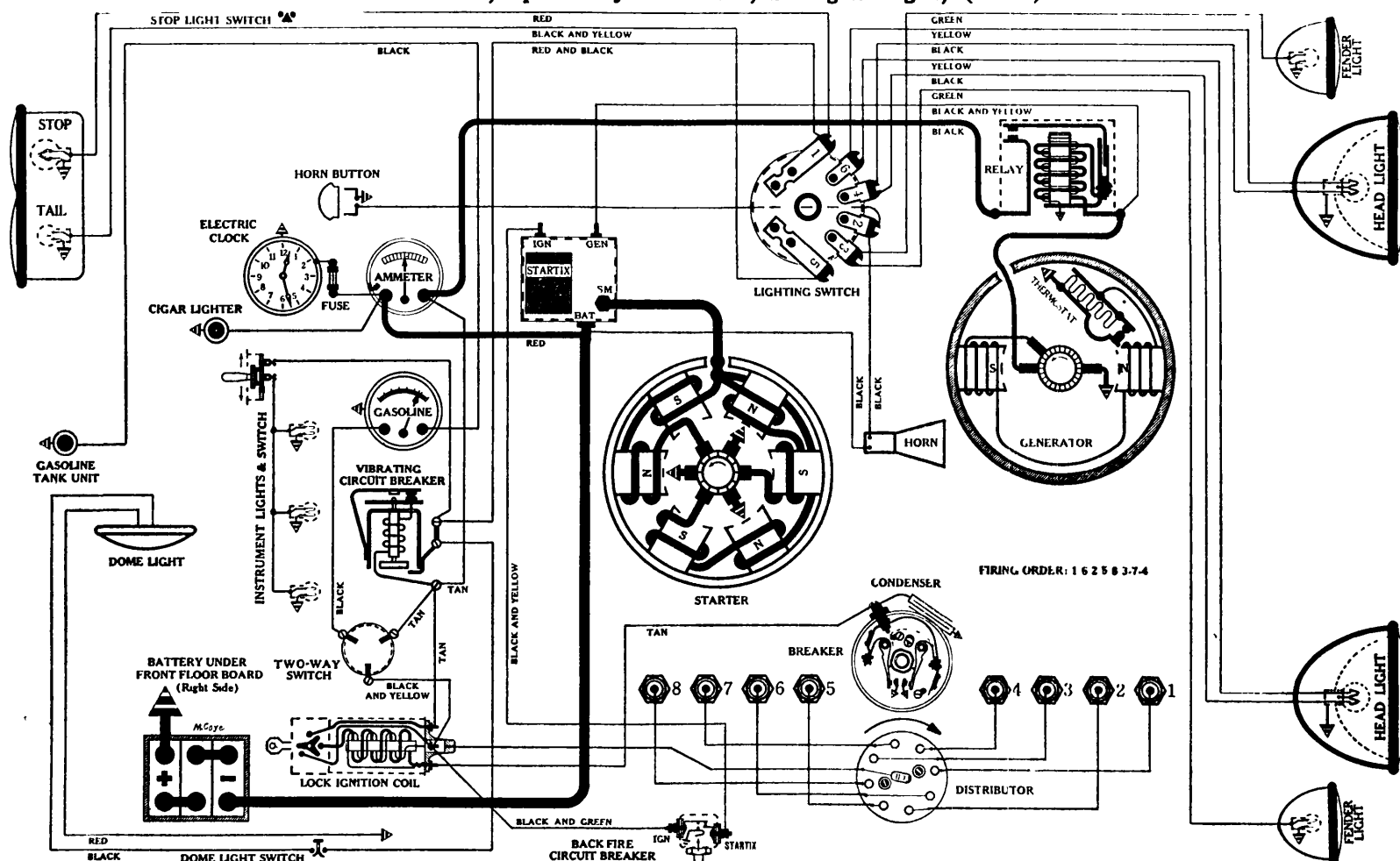
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Vibrating Circuit Breaker—Delco-Remy, 410-L. Starts 25 to 30 mps. Operates 10 to 15 amps.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; FENDER—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

STUDEBAKER

Mod 1 92, Sp edway President, Straight Eight, (1933)



BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded
Starting Capacity—160 amps. for 20 minutes.
Lighting Capacity—6.6 amps. for 20 hours.
Box—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 497

Connection to Engine—Bendix Drive, Type R11SXT-10.
Running Free—70 amps. at 5 volts, 3000 R.P.M.
Cranking Engine—230 to 245 amps. at 4.1 volts.
Lock Torque—19 pound-feet, 500 amps. at 3 volts.
Brush Spring Tension—36 to 40 oz. on each.
Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device, in conjunction with "Startix" Circuit Breaker fitted to intake manifold.
Armature—Delco-Remy, 1843420.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 662-G

(Semi-Automatic Spark Advance in conjunction with Delco-Remy, 680-C Vacuum Control)

Breakers—Contact separation .020 inch, or 56 cam degrees.
Contact Spring Tension—17 to 21 oz. on each.
Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke, bring flywheel mark "UDC 1-8" directly under pointer in flywheel housing. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C., as indicated on Gauge. With spark in full advance position, rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—18-MM (Champion type 8); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—25 degrees (on Flywheel).
Vacuum Control—6 degrees (on Flywheel).
Automatic Advance—25 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1300	6	650	3
1800	10	900	5
2500	16	1250	8
3000	20	1500	10
3600 (Max.)	25	1800	12½

Lock Ignition Coil—Delco-Remy, 537-X.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-J, (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.					
Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	12	1200	7.8
5	800	7.1	16	1600	8.
9	1000	7.5	20	1700 (Max.)	8.2

Motoring Freely—3 to 3½ amps. at 6 volts.
Max. Stall Current—19 to 21 amps. at 6 volts.
Field Test—2 amps. at 6 volts across field coils in series.
Brush Spring Tension—20 to 28 oz. on each.
Armature—Delco-Remy, 1839078.
Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

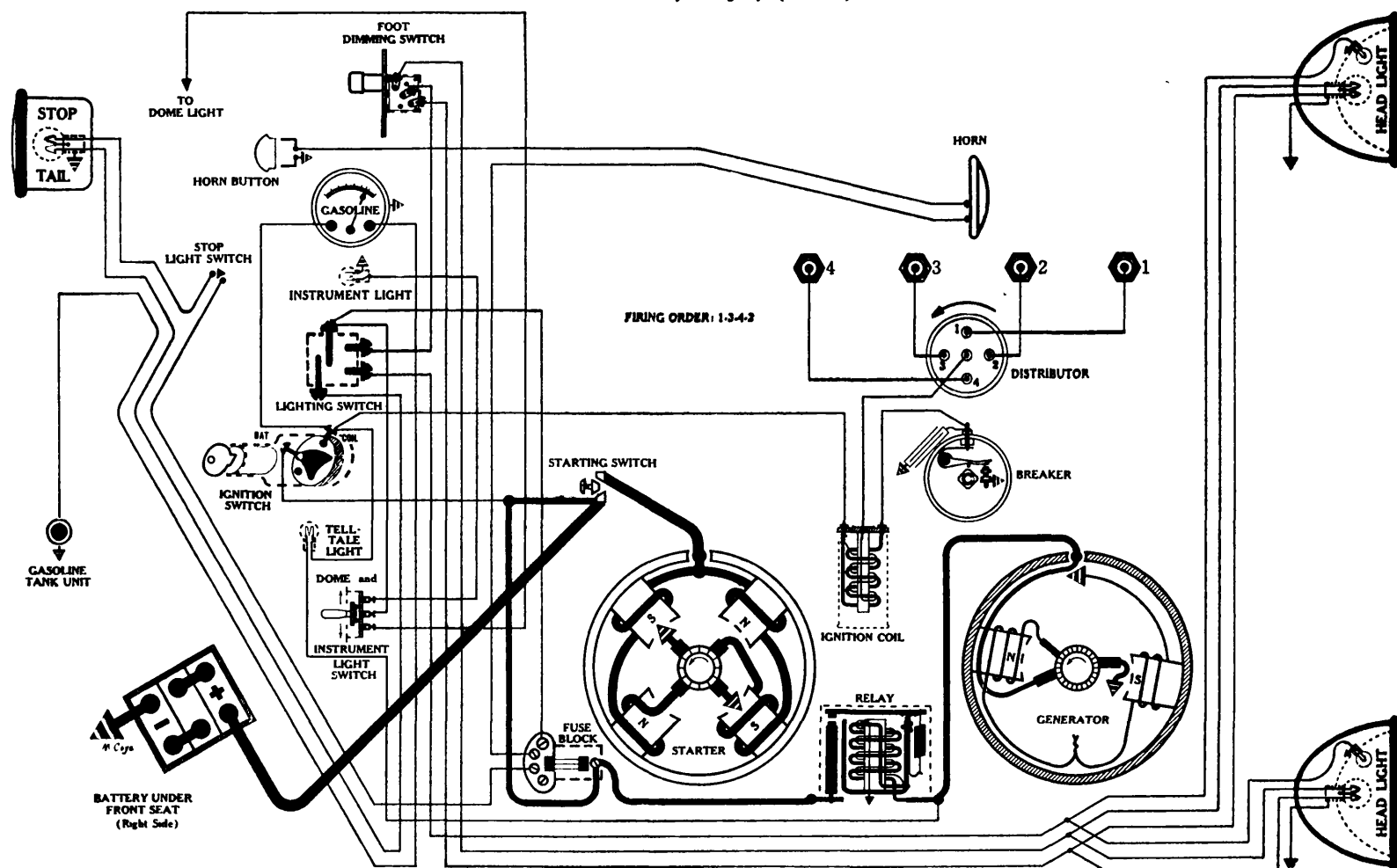
Closes—7 to 7½ volts.
Opens—0 to 2½ amps. discharge.
Contact Gap—.015 to .025 inch.
Core Gap—.014 to .018 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9115.
Location—Foot of steering column. Lights controlled by lever on steering wheel.
Vibrating Circuit Breaker—Delco-Remy, 410-L. Starts 25 to 30 amps. Operates 10 to 15 amps.
Lamps—See Lamp Table, Sec. AA. HEAD—1110; FENDER—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

WILLYS

M d 177, 4 cyl., (1933)



BATTERY

U.S.L., CW-11-A, 6 volts. Negative Terminal Grounded

Starting Capacity—96 amps. for 20 minutes.

Lighting Capacity—4.2 amps. for 20 hours.

Box—Length, 9; width, 7½; height, 8½ inches.

NOTE:—To service battery remove cap screw holding, right front seat, and slide seat forward until it can be lifted from supports.

STARTER

Rotation, L. H., Com. End

Auto-Lite, MZ-4033

Connection to Engine—Bendix Drive, Type RC10HD.

Running Free—47 amps. at 5½ volts, 4902 R.P.M.

Cranking Engine—135 to 150 amps. at 4.2 volts.

Lock Torque—10 pound-feet, 470 amps. at 3½ volts.

Brush Spring Tension—44 to 56 oz. on each.

Starting Switch—Auto-Lite, SW-4001.

Armature—Auto-Lite, MZ-2089.

IGNITION

Rotation, L. H., Top View

Auto-Lite, IGB-4078

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch, or 47 cam degrees.

Contact Spring Tension—17 to 19 oz.

Timing—Loosen screw holding flywheel inspection hole cover, located in left top side of flywheel housing, and swing cover to one side. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "IGN" is directly under pointed end of inspection plate screw. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 4 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 4 piston is coming up on compression stroke. Stop when .006 inch before T.D.C., as indicated on Gauge. With rotor under No. 4 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type C-7); Gap .027 inch.

Firing Order—1-3-4-2.

Automatic Advance—25 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1040	4	520	2
1500	8	750	4
1940	12	970	6
2380	16	1190	8
2840	20	1420	10
3400	25	1700	12½

Ignition Coil—Auto-Lite, IG-4406.

Lock Ignition Switch—Mitchell Specialty, Type 17.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAM-4504, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.4	10	1100	7.2
2	785	6.6	12	1320	7.4
6	960	6.9	16	2400 (Max.)	8.

Motoring Freely—4½ to 5 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts

Field Test—4.2 amps. at 6 volts across field coils in series.

Brush Spring Tension—18 to 22 oz. on each.

Armature—Auto-Lite, GAM-2055.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. See Fig. 13, "Third Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4008, (Mounted on Sub Frame)

Closes—7 to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Culver-Stearns.

Location—Lower edge of instrument board, above steering wheel.

Fuses—Single 20 amp. fuse (type 3A-20) mounted on block under engine hood (right side).

NOTE:—This fuse is exposed to the weather. If trouble is experienced with Dim head lights, clean the fuse and fuse clips.

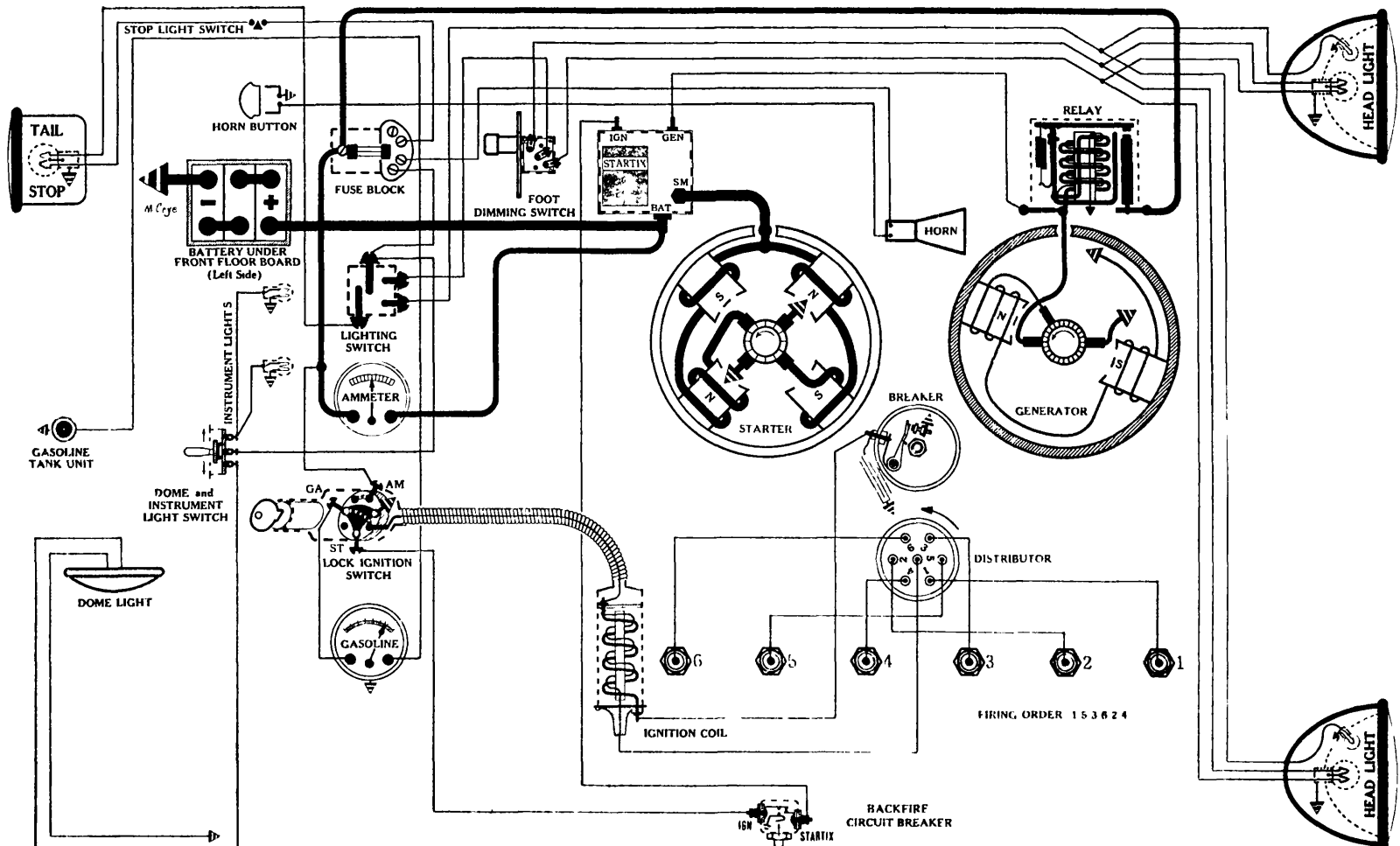
Foot Dimming Switch—Soreng-Manegold, No. A2100-A.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; AUX.—63; DOME—63; INSTRUMENT—63; STOP AND TAIL—1158; GENERATOR TELL-TALE—64. IMPORTANT! This is double contact bulb.

WILLYS

Model 99, 6 cyl., (1933)



BATTERY

U.S.L., XY-13-A, 6 volts. Negative Terminal Grounded
 Starting Capacity—102 amps. for 20 minutes.
 Lighting Capacity—4.3 amps. for 20 hours.
 Box—Length, 9; width, 7¼; height, 8½ inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAJ-4029

Connection to Engine—Bendix Drive.
 Running Free—67 amps. at 5.5 volts, 5000 R.P.M.
 Cranking Engine—165 to 180 amps. at 4.3 volts.
 Lock Torque—12½ pound-feet, 575 amps. at 3 volts.
 Brush Spring Tension—36 to 40 oz. on each.
 Starting Switch—"Startix" type D, Automatic Starting Switch and
 Anti-Stall Device, in conjunction with "Startix" Circuit Breaker
 fitted to intake manifold.
 Armature—Auto-Lite, MAJ-2046.

IGNITION

Rotation, L. H., Top View
 Auto-Lite, IGB-4032-A

Breaker—Contact separation .020 inch, or 26 cam degrees.
 Contact Spring Tension—17 to 19 oz.
 Timing—IMPORTANT! Time ignition in full advance position.
 Loosen screw holding flywheel inspection hole cover, and swing
 cover to one side. Slowly turn engine until No. 1 piston is com-
 ing up on compression stroke. Stop when flywheel mark "IGN"
 is directly under pointed end of inspection plate screw. With
 rotor under No. 1 Dist. Cap Terminal, breaker points should just
 open.
 Timing with MOTOR GAUGE—Remove No. 1 spark plug, and at-
 tach MOTOR GAUGE, using adapter No. 104 and rod No. 2.
 Slowly turn engine until No. 4 piston is coming up on com-
 pression stroke. Stop when .013 inch before T.D.C., as indicated on
 Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker
 points should just open.
 Spark Plugs—18-MM (Champion type C-7); Gap .027 inch.
 Firing Order—1-5-3-6-2-4.
 Manual Advance—20 degrees (on Flywheel).
 Automatic Advance—16 degrees (on Flywheel).

Eng. R.P.M.	Degrees Advance (on flywheel)	Dist. R.P.M.	Degrees Advance (on cam)
600	Start	300	Start
1400	4	700	2
2200	8	1100	4
3000	12	1500	6
3800 (Max.)	16	1900	8

Coil and Lock Switch Assembly—Auto-Lite, IG-4603.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAL-4331, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.3	13	1200	7.5
6	800	6.9	15	1400	7.7
10	1000	7.1	17	1900 (Max.)	8.

Motoring Freely—4½ to 5 amps. at 6 volts.
 Max. Stall Current—16 to 19 amps. at 6 volts.
 Field Test—4½ amps. at 6 volts across field coils in series.
 Brush Spring Tension—10 to 13 oz. on each.
 Armature—Auto-Lite, GAL-2143.
 Third Brush Adjustment—Loosen cover band. See Fig. 13, "Third
 Brush Adjustment" page, Sec. AA.

RELAY

Auto-Lite, CB-4021-S

Closes—7 to 7½ volts.
 Opens—½ to 2½ amps. discharge.
 Contact Gap—.025 to .035 inch.
 Core Gap—.010 to .012 inch, contacts closed.

LIGHTING

Switch—Culver-Stearns.
 Location—Lower edge of instrument board, above steering column.
 Fuses—Single 20 amp. fuse (type 3A-20) mounted on block under
 engine hood (left side).
 NOTE—This fuse is exposed to the weather. If trouble is experienced with Dim
 head lights, clean the fuse and fuse clips.
 Foot Dimming Switch—Soreng-Manegold, No. A2100-A.
 Location—On toe board (left side). Tilt beam controlled by press-
 ing foot plunger.
 Lamps—See Lamp Table, Sec. AA. HEAD—1110; AUX.—63;
 DOME—63; INSTRUMENT—63; STOP AND TAIL—1158.

LAMP DATA

REVISED TO JUNE 1, 1934

Code numbers, technical specifications and data verified by The Automotive and Aviation Incandescent Lamp Division of the General Electric Company, Nela Park, Cleveland, Ohio.

CONVENTIONAL MAZDA LAMP

No.	USED FOR	VOLTS	C.P.	BASE	AMPS.	STYLE	B or C
50	Head Light Indicators (Cadillac and LaSalle 1934)	6-8	Nil	Miniature Screw	.20	G-3½	
51	Head Light Indicators	6-8	Nil	Miniature Bayonet	.20	G-3½	
61	Rear & Inst. (2 in series)	3-4	2	S.C.	0.84	G-6	B
62	Rear & Inst. (2 in series)	3-4	2	D.C.	0.84	G-6	B
63	REAR, INST., SIDE, STEP, AUX. HEAD	6-8	3	S.C.	0.53	G-6	C
64	"TELL-TALE" OR INDICATOR	6-8	3	D.C.	0.53	G-6	C
67	REAR, INST., SIDE, STEP, AUX. HEAD	12-16	3	S.C.	0.26	G-6	C
68	REAR, INST., SIDE, STEP, AUX. HEAD	12-16	3	D.C.	0.26	G-6	C
81	DOVE & PANEL	6-8	6	S.C.	0.89	G-6	C
82	DOVE & PANEL	6-8	6	D.C.	0.89	G-6	C
87	Stop, Backing	6-8	15	S.C.	1.67	S-8	C
88	Stop, Backing	6-8	15	D.C.	1.67	S-8	C
89	Dome & Panel	12-16	6	S.C.	0.48	G-6	C
90	Dome & Panel	12-16	6	D.C.	0.48	G-6	C
1000	Head (2 filaments) depressible beam	6-8	32 } 32 }	D.C.	3.70 } 3.70 }	S-10	C
1110	Head (2 filaments) depressible beam	6-8	21 } 21 }	D.C.	2.46 } 2.46 }	S-10	C
1114	Head (2 filaments) depressible beam	6-8	21 } 21 }	D.C.	2.46 } 2.46 }	S-10	C
	<i>Read foot-note before installing.</i>						
1116	Head (2 filaments) depressible beam	6-8	32 } 21 }	D.C.	3.70 } 2.46 }	S-10	C
1118	Head (2 filaments) depressible beam	6-8	32 } 21 }	D.C.	3.70 } 2.46 }	S-10	C
	<i>Read foot-note before installing.</i>						
1129	HEAD, SPOT, STOP	6-8	21	S.C.	2.39	S-10	C
1130	HEAD, SPOT, STOP	6-8	21	D.C.	2.39	S-10	C
1133	HEAD, SPOT, STOP	6-8	32	S.C.	3.62	S-10	C
1134	HEAD, SPOT, STOP	6-8	32	D.C.	3.62	S-10	C
1141	Head & Spot	12-16	21	S.C.	1.15	S-10	C
1142	Motor Coach	12-16	21	D.C.	1.28	S-10	C
1143	Head & Spot	12-16	32	S.C.	1.71	S-10	C
1144	Head & Spot	12-16	32	D.C.	1.97	S-10	C
1158	Head for Fords (1921 to 1928)	6-8	21 } 2 }	D.C.	2.49 } 0.54 }	S-10	C
	Also Stop and Tail from 1929 on						
1170	Head for Fords (1921 to 1928)	6-8	21 } 6 }	D.C.	2.49 } 0.90 }	S-10	C
1172	Head for Fords (1921 to 1928)	6-8	32 } 6 }	D.C.	3.70 } 0.90 }	S-10	C
2320-C	See next page.						
2330	See next page.						
3001	Head for Cadillacs (1932-33 only)	6-8	21 } 21 } 32 }	T.C.*	2.92 } 2.92 } 4.09 }	S-12	C
3003	Head for Packards (1933-34)	6-8	32 } 32 } 32 }	T.C.*	4.15 } 4.15 } 4.15 }	S-12	C

*Triple Contact.

IMPORTANT: Mazda lamps Nos. 1000, 1110, and 1116 are interchangeable. Automobiles equipped with depressible beam headlights (sometimes called "Tilt-Ray" or "Bifocal" headlights) are usually delivered with the 21-21 C.P., No. 1110 lamps as original equipment. If higher C. P. lamps are desired, substitute the 32-32 C.P., No. 1000 lamps, or the No. 1116 lamps. *Under no circumstances use lamps Nos. 1114 or 1118 in these cars.*

The difference between Mazda lamps Nos. 1000, 1110, and 1116, and Mazda lamps Nos. 1114 and 1118 is in the plane of the base pins.

(OVER)

LAMP DATA

(continued)

REVISED TO JUNE 1, 1934

The new Prefocused Lamp developed for headlights on 1934 automobiles.

(Prefocused lamps will not fit conventional lamp sockets).

A MAJOR ADVANCE IN HEADLIGHTING PRACTICE.



CONVENTIONAL
LAMP

The new Prefocused lamp which was introduced on a large number of 1934 cars constitutes another forward step in automotive lighting.

It insures more uniform performance of headlights throughout life of car.

It makes possible a new design in headlight equipment so that headlights may be made smaller—to become part of the car's streamlines.

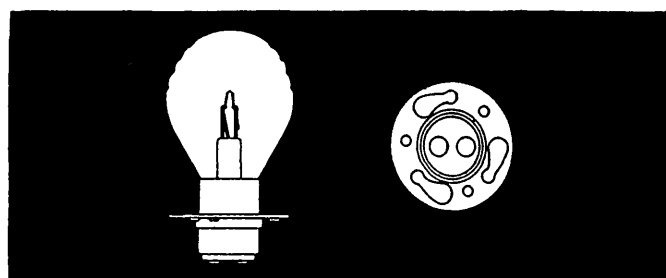
It makes for greater beam accuracy.

The lamp itself is made with extreme precision. The maximum tolerance in the location of the filament is .010 of an inch. The reflector-socket assembly is also made with greater accuracy.



PREFOCUSED
LAMP

EASY TO INSTALL



DETAIL DIAGRAM OF BASE

Insertion of the lamp is easier than under the old method. The flanged collar has three "buttonholes" unequally spaced, which engage three pins in the socket. The base is marked "TOP". At this point there is a notch on the collar to aid in correctly aligning the wide ends of the buttonholes with the socket pins.

Hold lamp in position marked "TOP".

Make certain that the pin heads of socket engage wide ends of buttonholes.

Press firmly into cup-like section in rear of reflector.

Rotate clockwise until lamp clicks into its seat. To remove lamp reverse the operation.

PREFOCUSED MAZDA LAMP

No.	USED FOR	VOLTS	C.P.	BASE	AMPS	STYLE	B or C
2320-C	Headlights on 1934 "Master" Chevrolets, Chryslers, DeSotos, Dodges, Grahams, Hudsons, Hupmobiles, Oldsmobiles, Pontiacs, and Terraplanes	6-8	32 21	Pref.	3.70 2.66	S-10	C
2330	Headlights on 1934 Buicks, Cadillacs, and LaSalles	6-8	32 32	Pref.	3.70 3.70	S-10	C

**Technical Section
of
The Standard Supplement
For 1934**

25 pages of valuable information on the latest developments in automotive electrical engineering.

We advise every auto-electrician and mechanic to read this section very carefully.

1934 LAMP LOAD GENERATORS

Standard equipment on Chevrolet, Oldsmobile, and other 1934 Automobiles.

NOTE: It is true that the charging rate of 1934 Cadillac Generators is influenced by the lamp load, however, their generator output actually is controlled by a vibrating point current regulator working in conjunction with the lamp load, and for that reason technical information, as well as adjustment specifications, will be found under the heading of "1934 Delco Remy Current Actuated Regulators."

Auto-Electricians, of course, are familiar with the two standard types of Delco-Remy, third brush regulated generators, in internal circuits of which are shown in Figures 1 and 2

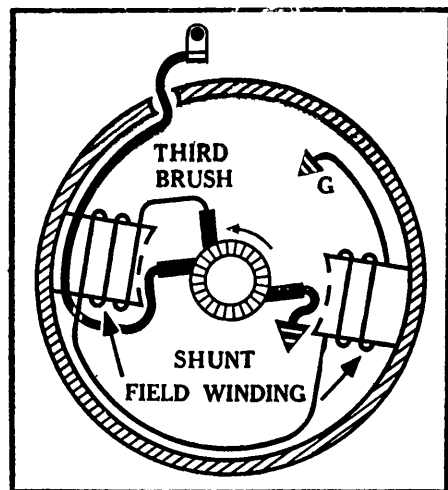


Fig. 1.

Internal circuits of a conventional Delco-Remy, third brush regulated generator. One end of the shunt field winding is connected to the third brush, while the other end is grounded to the field frame at "G".

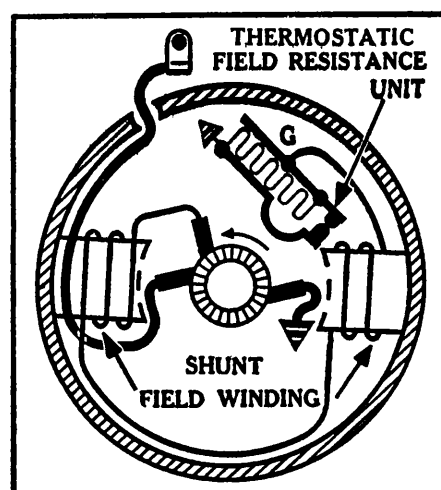


Fig. 2.

Internal circuits of a conventional Delco-Remy, third brush regulated generator equipped with a field thermostat. One end of the shunt field winding is connected to the third brush, while the other end is attached to the thermostat at "G", and is grounded through it.

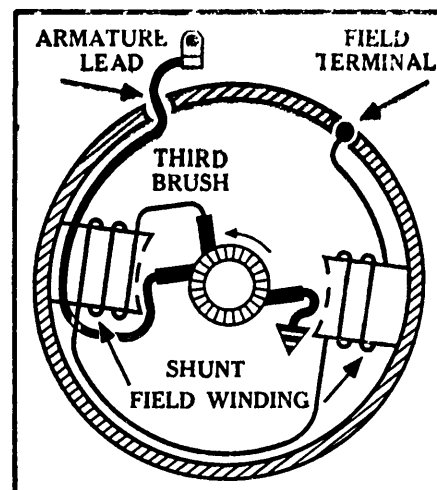


Fig. 3.

The new Delco-Remy Third Brush Lighting Switch controlled Generator. One end of the shunt field winding is connected to the third brush, while the other end is brought out to an insulated terminal marked "field".

Lamp load generators may be divided into two classifications. First, the third brush regulated generators, similar to those shown in Figures 1 and 2, and second, the divided field type which will be explained later. The new type generators no longer ground one end of the field inside of the generator frame but insulate that end, and bring it out through an extra terminal marked "field", see Fig. 3.

This extra terminal is connected to one end of a field resistance unit located at the lighting switch. When the lighting switch is in the "off" or "park" positions the field is grounded through the resistance unit which, of course, puts resistance in the shunt field circuit, thus reducing the generator charging rate.

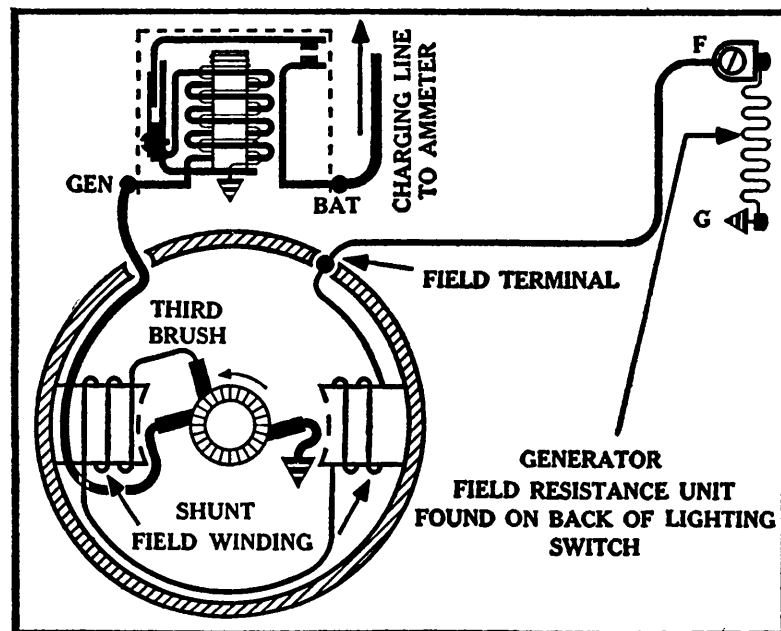


Fig. 4.

A Lamp Load Generator with Lighting Switch either in the "off" or "park" positions. Note that the shunt field is now connected to ground through the lighting switch field resistance unit.

Figure 4 shows a lamp load generator of this type with the field resistance (found on back of the lighting switch) in series with the shunt field or, in other words, the lighting switch is either in the "off" or "park" positions.

Figure 5 shows the circuits through the same generator when the lighting switch is in the "on" position and the lamps are burning. From this diagram it will be seen that the field resistance at the switch is "shorted out" by two contact points and their connecting bar.

Figure 6 is a back view of the new Delco Remy No. 478 R lighting switch which is standard equipment on 1934 Oldsmobile Eight automobiles.

The value of the field resistance units supplied as standard equipment is one ohm. This value has been found to meet average driving conditions. An excessive amount of either night or day driving will necessitate the changing of the value of the field resistance unit, found on the switch back, to one having either less or more resistance. When the night driving is greater than the day, and the charging rate will not keep the battery "up" sufficiently, a one half or three-quarters ohm resistance should be substituted for the standard one ohm unit.

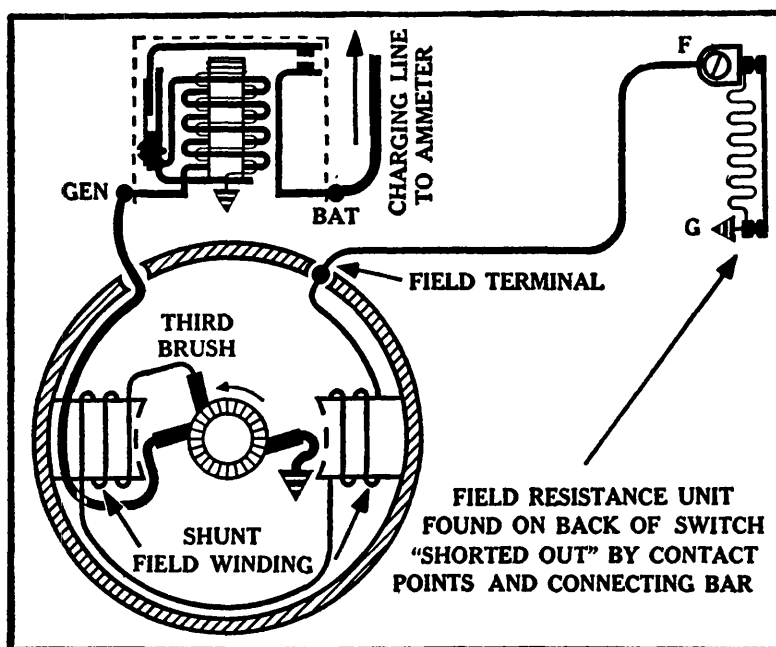


Fig. 5.

A Lamp Load Generator with Lighting Switch in "on" position. Note that the shunt field is connected direct to ground by the switch bar and contacts.

The charging rate of these generators is adjusted by shifting the position of the third brush. In making charging rate adjustments an accurate reading portable ammeter should be connected in series with the charging circuit. The field terminal on the generator should next be grounded (do not attempt to do this by turning the lights "on"), and the generators set to the following specifications:—

Generator Model	Cold Output (Field Terminal Grounded)			Hot Output (Field Terminal Grounded)		
	Amps.	Volts	R.P.M.	Amps.	Volts	R.P.M.
Delco-Remy 935-B (Chevrolet)	16 to 19	8. to 8.4	2400	13 to 15	7½ to 8	3000
Delco-Remy 935-F (Oldsmobile)	16 to 19	8. to 8.4	2400	13 to 15	7½ to 8	3000
Delco-Remy 935-M (Oldsmobile)	16 to 19	8. to 8.4	2400	13 to 15	7½ to 8	3000

DIVIDED FIELD CIRCUIT LAMP LOAD GENERATORS.

The internal circuit of a typical divided field lamp load generator is shown in Fig. 7.

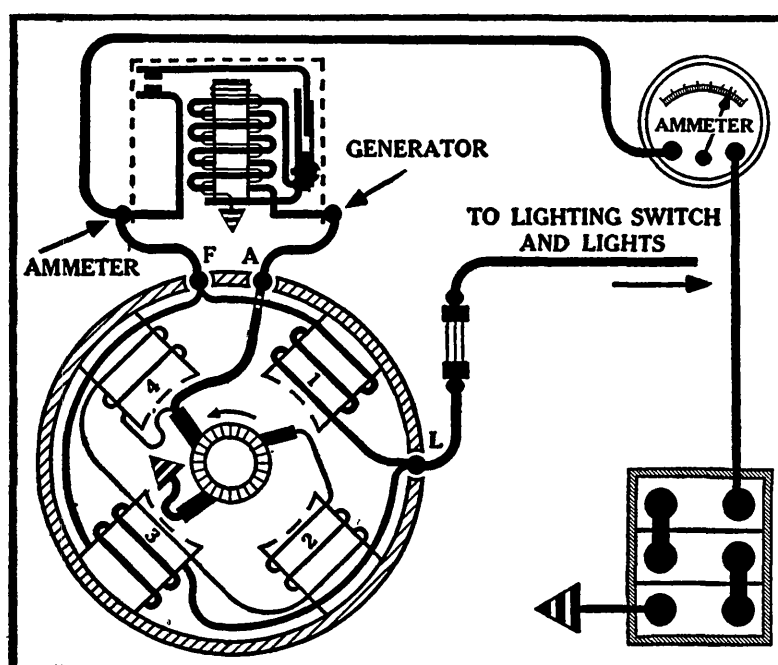


Fig. 7.

A typical Delco-Remy Divided Field Circuit, Lamp Load Generator.
A typical Delco-Remy Divided Field Circuit, Lamp Load Generator.

On the other hand, if the battery is found to be continually overcharged, the value of the resistance unit should be increased, and a unit with a resistance of one and one-half ohms used. It, of course, is unnecessary to warn auto-electricians against loose terminals and poor connections in the field circuit, as it is well known that there is no surer or quicker way to "kill" a generator than by "breaking" the field circuit.

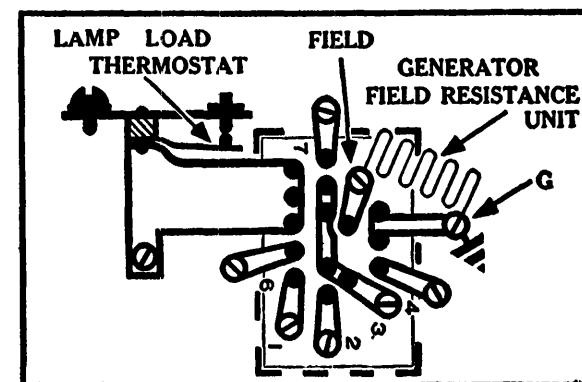


Fig. 6.

Delco-Remy No. 473-R Lighting Switch with Generator Field Resistance Unit, used on 1934 Oldsmobile Eights.

From this diagram it will be seen that the generator is a four pole machine, and that there are three terminals, marked "A" (armature or insulated main brush), "F" (field), and "L" (lights). It will also be seen that the conventional shunt field is wound on only two poles (Nos. 2 and 4), and that one end of this field is connected to the insulated main brush, while the other end is attached to the third brush. When a generator of this type is operated without a light load, field poles No. 2 and No. 4 are the only two poles which are actually magnetized by the field coils, as field poles Nos. 1 and 3 merely assume their polarity as a result of the magnetizing of poles Nos. 2 and 4, and thus the generator becomes a "consequent pole" machine.

The two heavy field windings on Poles Nos. 1 and 3, however, become active when the lights are turned "on". The feed for the lighting switch is taken from generator terminal "L" (lights), which means that every bit of the lighting current must first flow through the parallel connected field windings found on generator poles Nos. 1 and 3. These windings are placed on the poles in a way which will make them accumulative or, in other words, they assist poles Nos. 2 and 4, and thus strengthen the entire generator field magnetism, which results in a correspondingly higher charging rate.

When adjusting the charging rate of a divided field circuit lamp load generator, proceed as follows:—

First. Connect an accurate reading ammeter in series with the charging line, placing it between the generator terminal marked "A" (armature) and the generator side of the cut-out relay.

IMPORTANT: In making this test DO NOT connect the ammeter on the battery side of the cut-out relay.

The charging rate is adjusted in the conventional manner by moving the position of the third brush. Do not exceed the specified values when setting the charging rate.

Second. Connect the accurate reading ammeter in series with the lamp circuit to determine if the total lamp load is within the allowable value specified for that particular generator. Do not permit a lamp load to be maintained which is greater than specified for each individual type generator. In making charging rate adjustments bear in mind that it is not always necessary to set these generators to their maximum output.

OUTPUT DATA.

The maximum safe charging rate should not exceed the following tabulated values for each individual unit.

No.	Maximum Cold Output (Without Lamp Load)			R.P.M.	Maximum Hot Output (Without Lamp Load)			Allowable Lamp Load
	Amps.	Volts			Amps.	Volts	R.P.M.	
434	10 to 12	7.45 to 7.65		2000	6 to 8	7.05 to 7.35	2100	20
438	7.0	14.2		2100	4.6	13.7	2300	13
552	10 to 12	7.45 to 7.65		2000	6 to 8	7.05 to 7.35	2100	20
970-A	15 to 17	7.9 to 8.1		1500	11 to 13	7.45 to 7.65	1600	20
SM-1211	7.0	14.2		2100	4.6	13.7	2300	13
SM-1268	15 to 17	7.9 to 8.1		1500	11 to 13	7.45 to 7.65	1600	20

WARNING! Under no circumstances take entire generator output from generator terminal "A", as by so doing generator efficiency will be greatly impaired.

1934 DELCO-REMY CURRENT ACTUATED VIBRATING POINT REGULATORS

This new type of vibrating point current actuated regulator was developed for use on the 1934 Cadillac automobiles. The vibrating point regulators makes it unnecessary for a third brush to be used, as, the charging rate is controlled by the regulator.

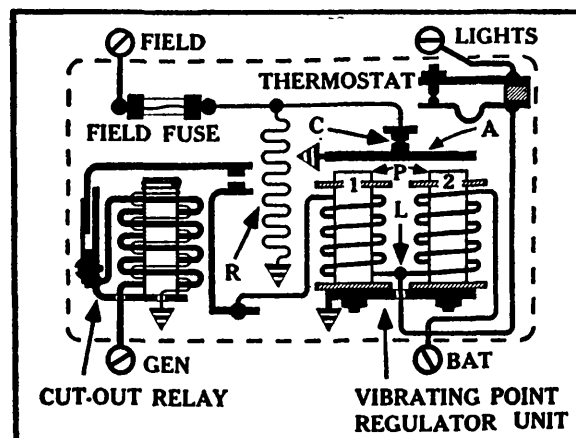


Fig. 1.

Delco-Remy 5541 Current Actuated Vibrating Point Regulator designed for 1934 Cadillac Automobiles.

Figure 1 shows the internal circuits of the Delco-Remy 5541 Vibrating Point Current Regulator which is standard equipment on all 1934 Cadillac automobiles. From this diagram it will be seen that the regular unit is comprised of two wound spools which go to make up an electro-magnet. When the two spools become sufficiently magnetized to overcome the spring tension which holds the regulator contacts together, the armature bar "A" (Fig. 1) is pulled down, and the two contact points "C" separated, thus diverting the shunt field current through the field resistance unit "R", to ground.

By "cutting" this resistance in series with the shunt field circuit, the field current is greatly reduced, which results in weakening the magnetic strength of the generator field. This cuts down the generator charging rates which, in turn, immediately results in weakening the magnetic strength of the two regulator spools, as the current flowing to the battery is diminished. When the magnetic strength of the spools becomes sufficiently weak, the spring tension on the armature bar "A" overcomes the magnetic pull of the spools and the contact points "C" again close. This action is repeated many times per second or, in other

words, the regulator points vibrate which is the reason these units are called "Vibrating Point Regulators". From this explanation it will be seen that the generator charging rate is controlled by the vibrations of the regulator points, and their period of vibration is determined by the tension of the spring on the regulator armature.

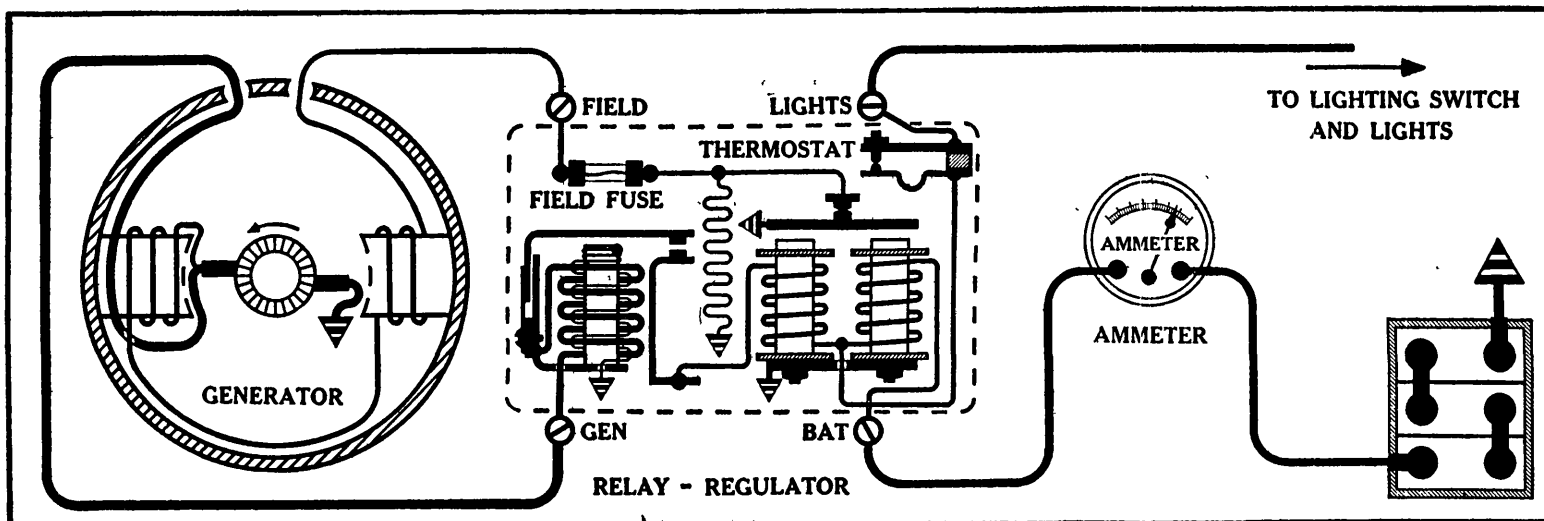


Fig. 2.

By referring to Fig. 2, which shows the current regulator, generator, battery and lighting circuit, it will be seen that when the lights are "off" all the generator charging current passes through both spools, on its way to the battery. Each spool is wound with twenty-one and a half turns of wire. If the regulator is adjusted to a charging rate of ten amperes, with no light load, the armature spring tension will have to be adjusted to an amount which will equal the magnetic pull of 430 ampere turns. ($21\frac{1}{2}$, the turns on each spool, times 2, because there are two spools, times 10, which is the charging rate that will produce 430 ampere turns.)

By again referring to Fig. 1 it will be seen that the feed for the lighting switch is taken from the connection "L", found between the two regulator spools. This means that when the lights are turned "on" the current to the lights flows around only one spool, "1", Fig. 1.

If, for example, the lights draw eleven amperes, we will have a resulting magnetic pull equal to 236.5 ampere turns, which is the result of the action of one spool. $21\frac{1}{2}$ (the turns on spool No. 1) times 11 (the light load), which equals 236.5.

Since it requires 430 ampere turns to operate, or cause the regulator points to open, the difference between 430 and $236\frac{1}{2}$, or $193\frac{1}{2}$ ampere turns must be furnished by an increase in the generator charging rate before the regulator points will open.

Since each spool has $21\frac{1}{2}$ turns of wire, and this extra charging current, on its way to the battery, will have to flow around both spools, or make 43 turns, therefore, $193\frac{1}{2}$ divided by 43, which equals $4\frac{1}{2}$, is the value of the increased charging rate. This results in the generator supplying current for an eleven ampere light load, and an additional $4\frac{1}{2}$ amperes to take care of charging the battery or, in other words, the generator will now have a total output of $15\frac{1}{2}$ amps. when the lights are burning. Always bear in mind that with a certain regulator spring tension the total number of ampere turns necessary to actuate the regulator points remains constant, so that in every instance the generator output is increased by half the lighting load.

Because it is advisable to increase the cold output of a generator on cars which are driven but a few miles per day, and decrease the charging rate on cars which are more continuously in service, a bimetal thermostatic armature hinge is provided on the regulator. When heated, the thermostatic tension decreases, which causes the vibrating points to operate earlier, resulting in a lower charging rate. The amount of this difference depends upon the relation between the force furnished by the thermostatic hinge and the spring tension. The spring is adjusted to balance the armature pull with a charging rate of 10 amperes (without lights), and this spring tension will, therefore, vary inversely with the square of the air gap between the armature "A", Fig. 1, and the pole cores "P".

Temperature compensation will also vary in this manner, and may be decreased by decreasing this gap, or increased by increasing the gap. If the gap is too small, the vibration frequency of the regulator will be low, while if it is too great, the force will be too small to properly operate the armature. A gap of .063 to .070 inch has been found best.

ADJUSTING VIBRATING POINT CURRENT REGULATORS.

The Delco-Remy 5541 unit should be adjusted warm, or at approximately room temperature, as this unit is compensated for heat.

Units 5543 and 5545 are not compensated for temperature; therefore, will regulate the generator output to a specified amount when they are adjusted, either when hot or cold.

Remove the device from the car, and check on a test bench. The procedure for testing a current regulator is as follows:

1. Push armature down until fiber bumper touches the stop. Adjust air gap between center of core and the armature .055 to .060 inches.
2. With armature down against lower armature stop, the contact spring stop should be changed until the point opening is .015 to .025 inches. Spring tension measured at the contacts should be approximately $2\frac{3}{4}$ ounces.
3. With armature released there should be a gap of .006 to .008 inches between the fibre bumper and the contact spring stop. Bend upper stop until correct gap is obtained.
4. With lights off, check the maximum current output of the generator by connecting an accurate reading ammeter in the charging circuit at the regulator terminal marked "battery". Increasing the spring tension on the armature increases the current output. After making adjustments, and before checking the ammeter readings, replace the regulator cover.

OUTPUT SETTING.

The regulator should be set so that the maximum cold generator output (lights off) will be (5541) 14 to 16 amperes, (5543) 7.5 to 8.5 amperes, (5545) 6.5 to 7.5 amperes. The model 5541 unit, when connected to an 11 ampere lamp load, regulates the generator output at 19 to 21 amperes. Models 5543 and 5545 units, connected to a 7 ampere load, should be set to regulate the generator output to 11 to 13 amperes and 10 to 12 amperes, respectively.

LIGHT LOAD.

With lights "on" connect each unit to its specified load. Do not exceed these specified values, as overloading the light circuit will endanger the safe generator operation.

1934 "VOLTAGE REGULATORS"

Standard equipment on Chrysler, De Soto, Dodge, Hudson, Terraplane, and other automobiles.

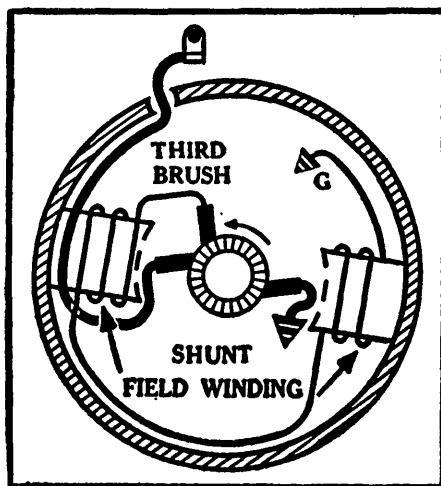


Fig. 1.

Internal circuits of a conventional third brush generator with one end of the shunt field grounded at "G".

The voltage operated charge regulators, developed by Auto-Lite and Delco-Remy, for use on the above 1934 automobiles are not, in the true sense of the word, voltage or constant potential regulators. A unit of the type to actually qualify to be called a voltage regulator should be capable of maintaining a predetermined line voltage under any and all conditions; in fact, the generator voltage should not increase, even though the battery were removed from the car. True voltage regulators usually employ VIBRATING POINTS to control the generator potential, while these new voltage operated, two stage battery charge regulators are of the hold-down type. This type employs regulator points that are either in one of two positions; apart, in which position field resistance is placed in series with the shunt field and the generator output reduced; or, touching together, which shorts out the field resistance and allows the generator to produce its maximum rate. In other words, these regulators insert a resistance in the generator field when the voltage rises to a certain predetermined point, and then "shorts" out the resistance after the voltage has dropped to a lower level. The important fact to note, however, is that there is a positive opening and closing action of the contact points, instead of the vibrating action used on true voltage regulators.

Electrical Service Stations throughout the country will soon be called upon to either make regulator adjustments on cars already so equipped, or else to install one make or another of the many devices now being offered to the motoring public. Before going into the details of any one unit it would be well to enumerate a few basic facts which every mechanic should thoroughly understand before undertaking either to adjust or install one of these units.

1. All voltage actuated regulating devices employ a fine high resistance voltage winding to make them operate, and the two ends of this winding are always connected to (or shunted across) the two main generator brushes.

This is an important detail, and one which should constantly be kept in mind. All American pleasure cars, without exception, use the single wire system or, in other words, one main generator brush is grounded, as is also one battery terminal. This means that one end of the regulator voltage winding must be grounded, and for that reason care must be exercised when installing a new unit, to make sure that all paint is cleaned away under the regulator, and a good ground connection is made. The other end of the voltage winding must be connected to the insulated main generator brush, and for that reason a terminal is always provided on every regulator, marked "Gen", which must be connected to the insulated generator terminal, or to the generator side of the cut-out relay. Bear in mind that the two connections just mentioned only have to do with the opening and closing operations of the regulator points, and should be considered separately from the field circuit.

2. All regulators (whether of the voltage or the current actuated type, or even a combination of both) are designed to insert resistance in series with the generator field circuit when they operate.

This means that the generator field circuit must be "broken into" or "opened up" in order to make it possible for field resistance to be put in that circuit. For this reason one end of the generator field must be insulated, and brought out from inside the generator, either by adding a "field" terminal to the generator, or by drilling a hole through the frame, and bringing out a wire. Figure 1 shows a conventional third brush regulated generator, with one end of the shunt field grounded at "G".

Figure 2 shows this same generator after the grounded end of the field has been insulated and attached to the "field" terminal.

Regulators always have one terminal marked "field" which should be connected to the field terminal on the generator.

3. By simply looking at a regulator it is not always possible to tell whether the device is designed to be connected in the insulated or grounded end of the field circuit. To positively determine this it is necessary to use a test light. Hold one test light prod on the regulator terminal marked "field" and touch the other prod, first to the regulator frame (ground), and then to regulator terminal marked "Gen". If the test light burns when the prod is touched to the regulator frame, the unit is designed to be connected in the grounded end of the shunt field circuit; while if the light burns when the prod is touched to the "Gen" terminal the unit must be connected in the insulated end of the field circuit.

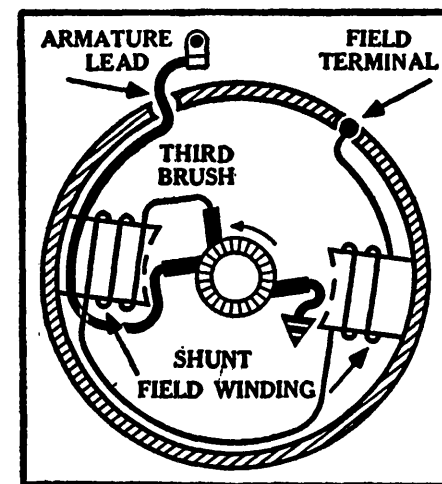


Fig. 2.

Internal circuits of the same generator shown in Fig. 1. However, the field terminal "F" has been provided to make it possible for a voltage regulator to be used.

In rare instances two "field" terminals are placed on a regulator, and when a test light is used, no connection will be found between either of the two field terminals and ground, or the "Gen" terminal. Regulators of this type are designed to be connected in series with the field circuit between one end of the shunt field and the third brush. Generators which require this type of regulator will be found to have three terminals, one connected to the insulated main brush, another to one end of the shunt field, and the other to the third brush.

4. In making voltage regulator adjustments either on original equipment or after installing a new unit, it is absolutely essential that an accurate reading voltmeter be used, which will permit of reading tenths of a volt. As practically all six volt regulators are designed to start operating between the ranges of 7.5 and 8.3 volts, a meter with a ten volt scale is the most practical. In addition to the voltmeter a mechanic should also have an accurate reading ammeter, with about a 30 amp. scale, which should be connected in series with the charging circuit.

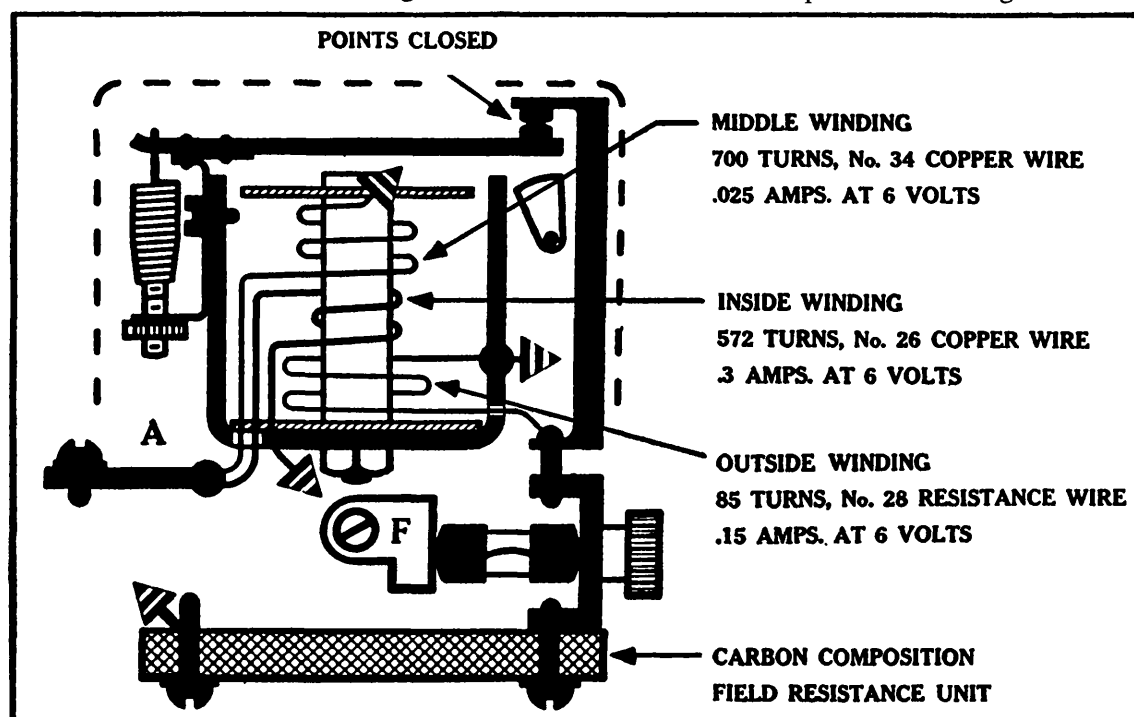


Fig. 3.

Internal circuits of the Auto-Lite, TC-4102-A, Two Stage Voltage Controlled Battery Charge Regulator. always be distinguished from a cut-out relay because—Regulator points are always CLOSED when a generator is not running, while on the other hand, cut-out points are always OPEN. Figure 3 shows a regulator with the contact points closed.

7. If you are called upon to diagnose trouble in a generator which is equipped with a regulator (be it either of the current or voltage types), and there is a question whether the trouble is in the generator itself or in the regulator unit; simply "jump out" the regulator by connecting the generator terminal marked "field" to either the grounded or the insulated main brush terminal, depending upon in which end of the field circuit the regulator is connected. (All of the new Auto-Lite and Delco-Remy units are connected to the grounded end of the shunt field so, in this case, the generator field lead should be grounded.) If, after "jumping out" the regulator unit the generator functions, the trouble is in the regulator, while if the generator does not work, the trouble is in the generator itself.

Figure 4 shows the internal circuits of the Delco-Remy 5554 voltage operated battery charge regulator.

This unit is supplied with the Delco-Remy 935-L "Aero-Volt" high output generators. The cut-out relay, which is a part of this unit, is of standard construction and operation. The core gap, when the contact points are closed, should be adjusted from between .012 inch to .017 inch. The contact separation should be .015 inch when the points are open. The cut-out spring tension should be adjusted so that the relay will close when the generator brush voltage builds up to a value of from 6.75 to 7.25 volts.

By again referring to Fig. 4 it will be seen that there is an extra set of contact points on the cut-out relay, which are closed when the relay points are open. These contacts form a circuit from terminal "GRD" to ground, and are designed to be used in conjunction with the starting motor solenoid relay and vacuum starting switch. These auxiliary contacts also serve as a stop for the upward travel of the cut-out armature.

When this generator first starts to charge the voltage control relay points are closed, or in the position shown in Fig. 4. When the battery becomes fully charged, and the generator brush voltage

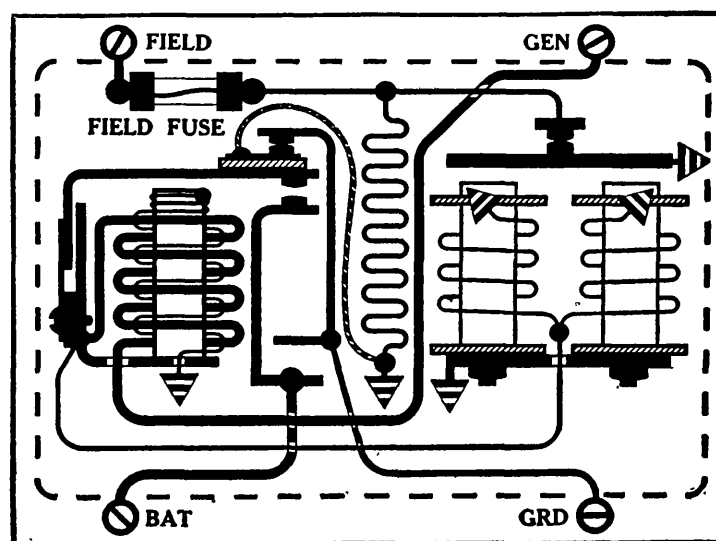


Fig. 4.

Internal Circuits of the Delco-Remy 5554 Voltage Operated Regulator.

reaches a predetermined high value (8.3 volts), the contact points open, thus diverting the shunt field current through the field resistance unit, which automatically weakens the generator field and reduces the charging rate. When the battery voltage decreases to a predetermined low value (7.2 volts) the regulator contact points will again close, thus "shorting out" the field resistance which, of course, results in increasing the generator charging rate.

ADJUSTING VOLTAGE OPERATED REGULATORS.

Remove the apparatus box from the car, and check on the test bench. Proceed as follows:—

1. Hold the armature down against the lower armature stop, and set the air gap at .038 inches. Spring tension measured at the contacts should be approximately $\frac{3}{4}$ ounce.
2. Release the armature and adjust the travel between the armature and the lower armature stop to .028 inches. This travel is varied by bending upper armature stop backward or forward.
3. With the armature in the extreme downward position again, the contact point opening should be between .008 to .013 inches.
4. Connect an accurate reading voltmeter between the terminal marked "BAT" and ground.
5. Run the generator until the apparatus box has reached a very warm temperature. Control relay points should open at 8.3 volt. Increase or decrease opening voltage by increasing or decreasing the armature spring tension, respectively.
6. Control relay points should close at 7.2 volts. Closing voltage is increased by increasing the armature air gap, and decreased by decreasing the air gap. It is only necessary to bend the lower armature stop slightly to obtain closing voltage adjustment.

NOTE: When checking the opening and closing voltages, cycle the regulator before arriving at the true reading. Cover must be in place when checking readings. Do not overrun the voltages reached at each point. Insert a small resistance into the charging circuit if voltages cannot be reached.

7. If the air gap is altered considerably to obtain the correct closing voltage, it will probably be necessary to bend the upper armature stop to allow for any large change. In the event this adjustment is changed the contact point opening should again be checked within the limits specified.

RESISTANCE IN CHARGING CIRCUIT.

Even with a fully charged battery it may be difficult to obtain a voltage setting within the specified limits unless a small resistance is connected in the charging circuit. A variable resistance of sufficient current carrying capacity that will make it possible to obtain approximately .25 ohms resistance can be used to increase the voltage. The lowest possible resistance to obtain voltage should be used to prevent vibrating of contacts.

An inexpensive but very practical variable resistance to use for this purpose can easily be made of ordinary uninsulated iron telegraph wire. For experimental purposes our engineers closely wound thirty feet of this wire about a 5 inch generator field frame held in a lathe. After winding the coil it was slipped off of the frame, and slightly stretched in end to form a helix, with about 22 turns. (See Fig. 5.)

Suitable bending posts were fitted to both ends of the iron coil, and in addition, a short wire, just about the length of the helix, was attached to one binding post, and a snap clip soldered to the other end of the wire.

When using this device it is wired in series with the charging line by using the terminals "A" and "B". If clip "C" is snapped onto terminal "B", all the resistance is shorted out. By removing clip "C" all the resistance is "cut in". By snapping clip "C" onto various coils of the helix, varying amounts of resistance will result.

CYCLING THE REGULATOR.

To cycle the regulator increase the speed of the generator until the voltage is reached at which the points just open, then decrease the speed until the points just close. After making this cycle obtain true readings at the very instant the points open and close.

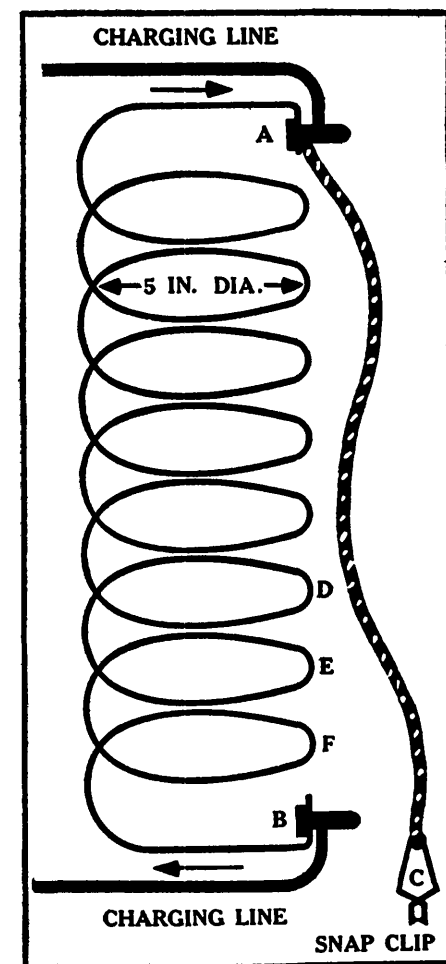


Fig. 5.

An inexpensive but practical resistance unit, for use when adjusting voltage operated charge regulators.

1934 Ford Generators with Voltage Operated "Two-Rate" Regulator

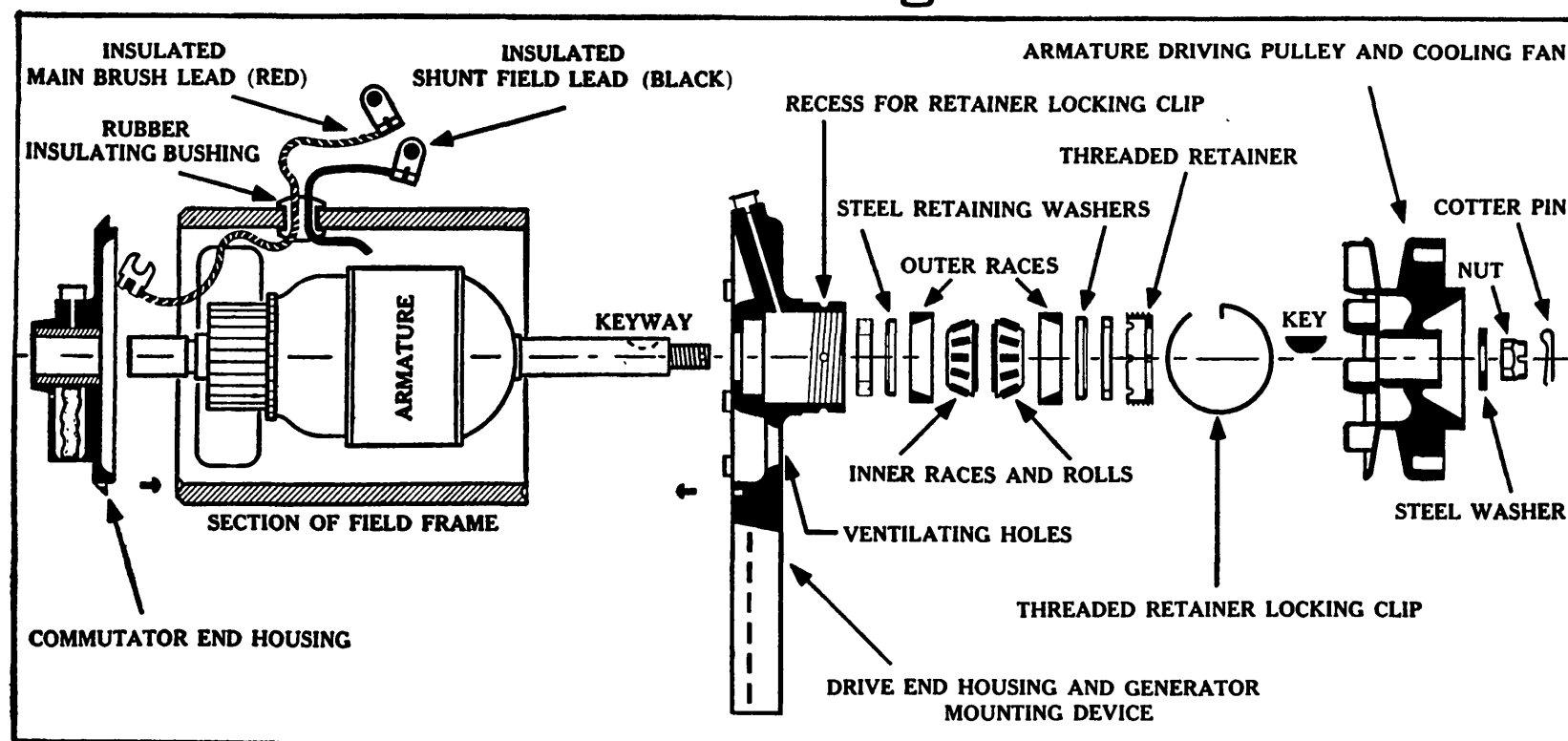


Figure 1.
Details of Armature and Bearing Assemblies of the new 40-10,000-B Ford Air-Cooled Generator.

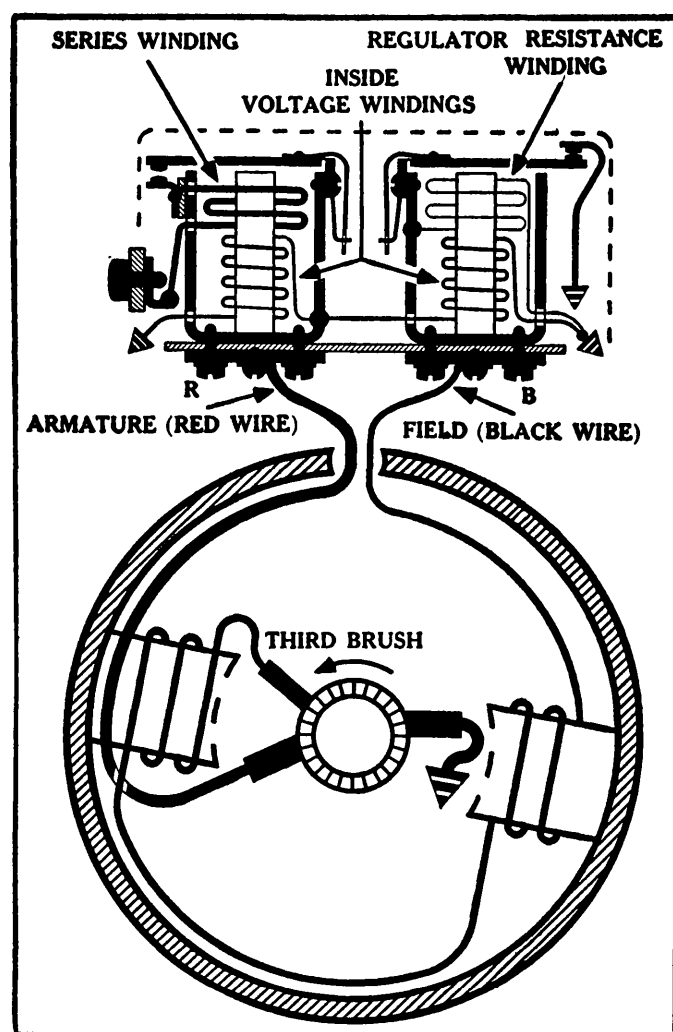


Figure 2.

Internal circuits of the new Ford No. 40-10,000-B Air-Cooled Generator and the No. 40-10505 Combination "Two Rate" Regulator and Cut-Out Relay.

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The Voltage Regulator (No. 40-10505), used with the new air-cooled Ford generators, automatically reduces the charging rate about 80% when the generator brush voltage builds up to approximately 8½ volts.

CUT-OUT.

The cut-out part of the voltage operated regulator is exactly the same as the cut-outs previously used. When the generator voltage builds up to between 6½ and 7 volts, the current through the cut-out voltage winding closes the cut-out points, thus completing the circuit to the battery. The main output of the generator passes through these points and through the series winding on the cut-out (see Fig. 2), which also tends to hold the points closed. The points remain closed until such time as the generator brush voltage drops below the voltage of the battery, when current from the battery reverses its direction of flow through the series winding, and causes the points to open.

REGULATOR.

Again referring to Fig. 2, which shows the internal circuits of the new Ford generator cut-out relay and regulator, it will be seen that the regulator consists of an electro magnet wound with a fine voltage winding (exactly the same as the cut-out voltage winding). The voltage windings on the cut-out and also on the regulator are connected in parallel. Besides the regulator voltage winding we find another high resistance winding which is placed outside of the voltage winding. This resistance winding is "cut" into the generator field circuit when the regulator points open. One of the contact points, which when closed "shorts out" the resistance winding, is mounted on a thermal support, which is designed to automatically compensate for any change in temperature of the regulator as well as for the voltage characteristics of the battery.

On the new generator two leads come from the upper side which are, in turn, attached to the relay as follows:

The armature lead (red wire) should be connected to the terminal marked either "A" (armature) or "R" (red), see Fig. 3.

The black lead is the field connection, and should be connected to the terminal on the regulator marked either with the letter "F" (field) or the letter "B" (black).

SETTING THE CHARGING RATE.

The maximum charging rate of the generator can be adjusted by changing the position of the third brush, as was true of all previous generators. However, it is necessary that the regulator points be closed when charging rate adjustments are made. The maximum normal capacity of this new generator is 18 amps. (previous generator rated capacity was 12 amps.).

The temperature reached by the generator is usually the limiting factor of the generator capacity. With the generator designed to discontinue charging when the brush voltage reaches a value of $8\frac{1}{2}$ the danger of damaging the unit from excess charging is greatly reduced.

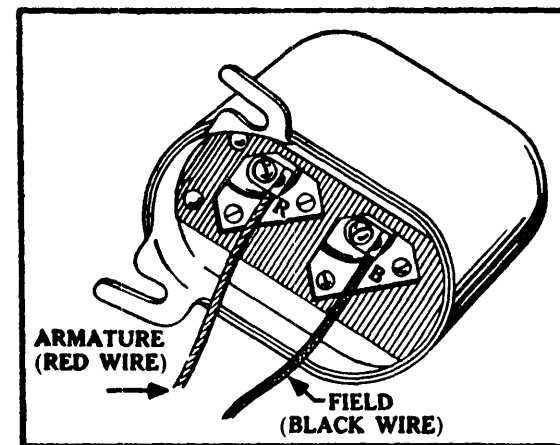


Figure 3.

Bottom view of the Ford "Two Rate" Regulator, showing how the wires should be connected.

Performance Data—Gen. cold. (Regulator points closed).

Amps.	R.P.M.	Volts
0.....	600.....	6.5
2.....	700.....	6.9
4.....	750.....	7.1
6.....	850.....	7.5
8.....	900.....	7.6
10.....	1000.....	7.7
12.....	1100.....	7.9
14.....	1300.....	8.1
16.....	1450.....	8.3
18.....	1500 (Max.).....	8.4

Motoring Freely—6 amps. at 5.8 volts.

Max. Stall Current—23 amps. at $4\frac{1}{2}$ volts.

Field Test—5 amps. at 5.1 volts across field coils in series.

THREE TERMINAL CUT-OUT RELAYS

New type, Three Terminal Delco-Remy Cut-Out Relays and Apparatus Boxes, incorporating an extra set of contact points to complete Solenoid Actuating Relay Circuit to ground.

In 1933, when solenoid starting switches were first "tied in" with the foot accelerator pedal action, in combination with a vacuum starting control switch, we found that as a safety measure a special remote control solenoid actuating relay was provided. This relay made it impossible for the starting motor solenoid to operate as long as the engine was running, and the generator was producing current. These remote control relays were combined with the regulator cut-out relay into a control box, which was mounted on the generator.

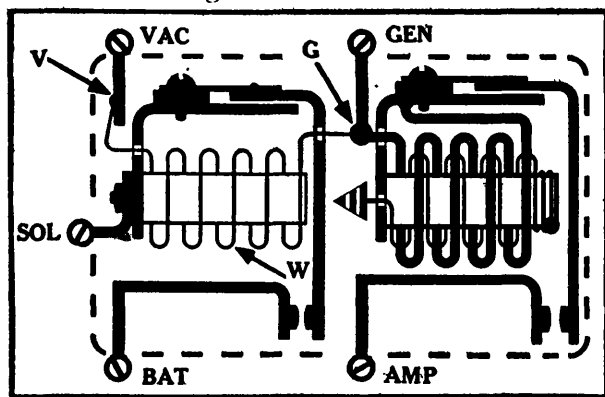


Fig. 1.

1933 Delco-Remy 264-D Apparatus Box mounted on the Generator.

Figure 1 shows the internal circuits of the 1933 Delco-Remy 264-D unit used on Chrysler, DeSoto, and Dodge automobiles. From this diagram it will be seen that there are five terminals on the unit, labeled "Vacuum", "Generator", "Ammeter", "Battery", and "Solenoid" respectively. It will also be seen that the circuit through the winding "W" on the remote control relay is grounded through the generator brushes and armature by connecting it to "G" on the generator side of the cut-out relay.

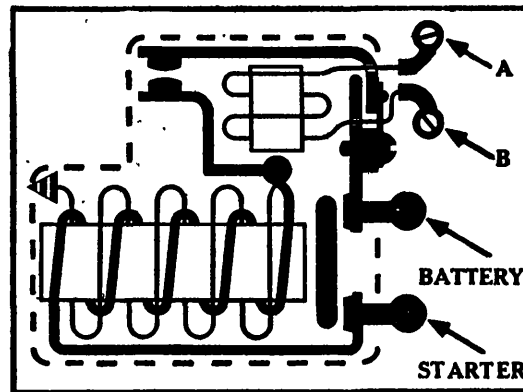


Fig. 2.

Delco-Remy Solenoid Starting Switch 1512, with self-contained Actuating Relay.

This same method of solenoid control was employed on the first 1934 Buicks; however, the remote control relay was combined with the starting motor solenoid, and made a part of that unit instead of being mounted in an apparatus box on the generator.

Figure 2 shows the internal circuits of the Delco-Remy 1512 solenoid starting switch, which has the actuating relay incorporated in it. This same type of solenoid starting switch is used on practically all 1934 Delco-Remy installations which employ the vacuum starting control.

The first 1934 Buick automobiles were equipped with a Delco-Remy 264-H apparatus box which, from external appearances, is difficult to distinguish from the 1933, 264-D unit. The 264-H unit, however, is comprised of a cut-out relay together with a horn relay, while the old 1933, 264-D unit was a combination of a cut-out and solenoid actuating relay.

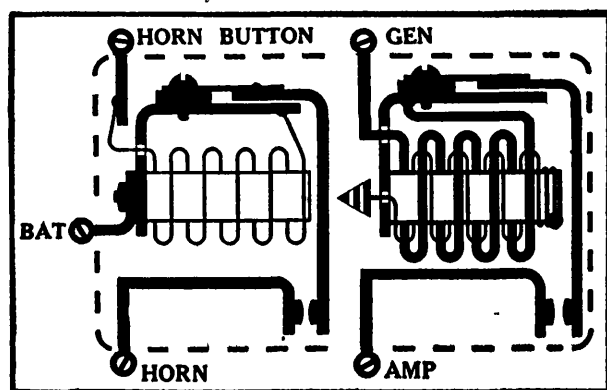


Fig. 3.

Delco-Remy 264-H Apparatus Box (used on early 1934 Buicks), which is comprised of a Cut-Out Relay and a Horn Relay.

Figure 3 shows the internal circuits of the early 1934 Buick apparatus box.

By again referring to Figures 1 and 2 it will be seen that the ends of the solenoid actuating relay winding, "A" and "B", Fig. 2) are really the same two ends labeled "V" and

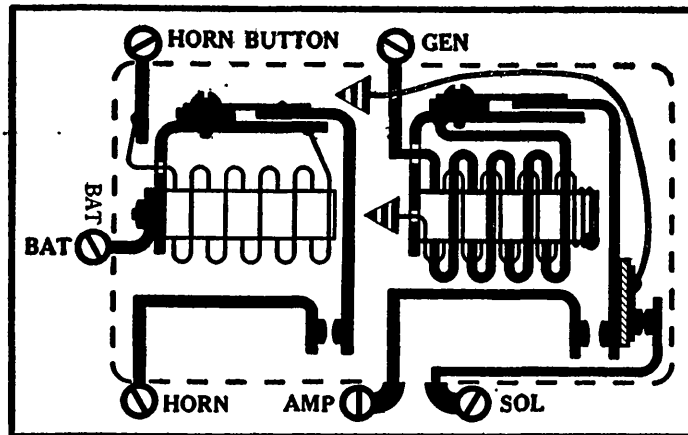


Fig. 4.

The new 264-K Apparatus Box (used on late 1934 Buicks). This device has an extra set of contact points mounted on the Cut-Out Relay Armature.

"G" (Vacuum Switch and Ground) on Fig. 1. As a matter of fact, that is exactly the way the new type solenoids are connected; however, the end "B", Fig. 2, is now grounded through the generator by running a lead from terminal "B" on the solenoid to terminal "Gen" on the apparatus box. This circuit may readily be traced by referring to the 1934 Buick, Model 34-50, wiring diagram.

From these diagrams it will be seen that the entire starting operation is dependent upon the proper functioning of the actuating relay. Under actual running conditions, however, some starting trouble developed, due to the fact that under certain

conditions it was impossible to obtain a perfect ground for the relay circuit when it was completed through the generator brushes. To overcome this difficulty on the late 1934 Buick automobiles a new apparatus box, Delco-Remy 264-K, was developed.

Figure 4 shows the internal circuits of this new unit, and by referring to this diagram it will be seen that an extra set of contact points have been added to the cut-out relay. The new units, instead of having five terminals, as in the past, now have six, labeled "Solenoid", "Ammeter", "Horn", "Battery", "Horn Button", and "Generator" respectively.

The new 264-K unit may be substituted for an early model 264-H box; however, in connecting the wires, the lead from the solenoid actuating relay, which formerly was connected to the "Gen" terminal on the 264-H unit, should now be connected to the sixth terminal on the 264-K box, marked "Solenoid". This new circuit may readily be traced by referring to the 1934 Buick, Models 34-60 and 90 wiring diagrams. By grounding the relay circuit through this extra set of contacts all chances of a poor or improper ground are eliminated, and positive starting solenoid action is assured, regardless of the generator brush or commutator condition.

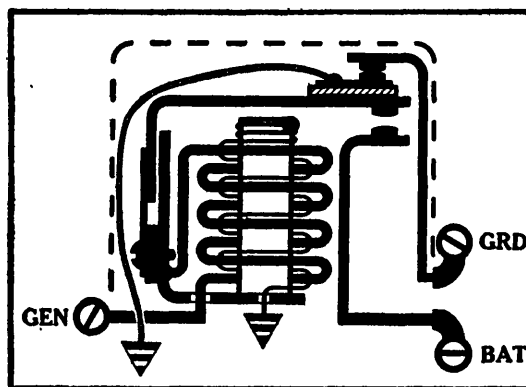


Fig. 5.

The new Delco-Remy 265-S, Three Terminal Cut-Out Relay with extra set of Contact Points mounted on the Cut-Out Relay Armature.

This same difficulty has also been experienced on other 1934 automobiles, with a result that the new 265-S, three terminal cut-out relay, shown in Fig. 5, is now being used instead of the conventional two terminal cut-out relay with which we are all familiar.

1934 AUBURN AND STUDEBAKER "CONTROL BEAM" HEADLIGHTS

The 1934 Auburn and Studebaker headlights are a radical departure from anything which has been used to date. While the light beam may be deflected up or down, similar to the bifocal or tilt-ray headlights, this deflection is not accomplished in the same manner. A magnetic operating device is now used for this purpose, which mechanically lifts the headlight bulb, causing the beam to be deflected downwards.

The Mazda No. 1000, 32-32 C.P. bifocal bulb is still used; however, the filaments are now mounted in a vertical plane instead of horizontally, as has been the practice in the past. By placing the filaments in this position it is possible to deflect the light beam sideways, and with this system one filament of a bulb illuminates the center of the road, while the other filament, when lighted, deflects the beam to the side or towards the gutter.

To properly understand the operation of these lights it might be well to review some of the elementary principles of physics, which enter into this problem. Every school child, sooner or later, plays with a mirror, and amuses himself by reflecting a light beam so that it will shine upon some particular object. In order to accomplish this it is necessary to move the mirror about until the reflected beam hits the object in question. The fundamental principle, that a light beam always leaves a mirror at exactly the same angle at which it strikes or, to say it more scientifically, that the angle of reflection always equals the angle of incident, is the one which engineers employ when designing the shape of headlight reflectors.

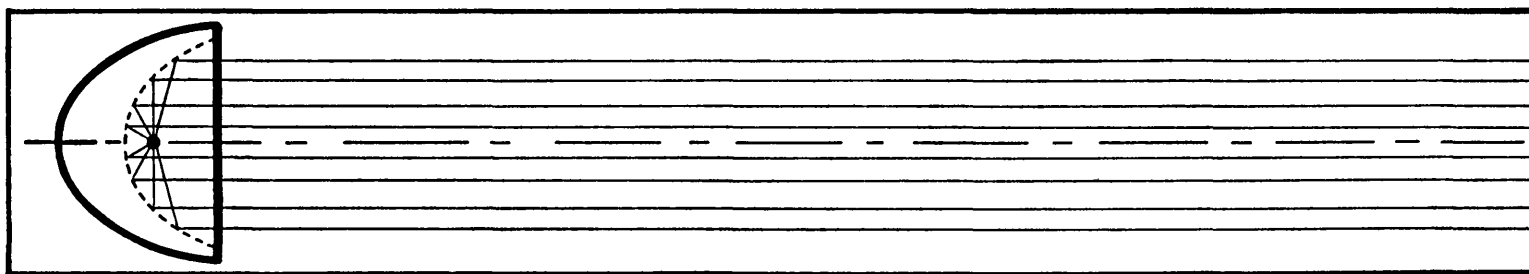


Figure 1.

Parabolic Headlight Reflector with filament placed at the focal center. Note that beams are projected straight ahead.

The source of light to be reflected is from the incandescent filament of the bulb, and a reflector is so designed and shaped about this filament that every light beam radiated from the filament is, in turn, reflected straight ahead. In a case of this sort the filament is said to be in the "focal" center, and the resulting curve of the reflector is known as a "parabola". To put it in more simple words, if we take any spot on the reflector we will find that that particular spot is, in itself, a mirror, and its position is such that the single ray of light which strikes it is reflected straight ahead. Figure 1 illustrates this principle.

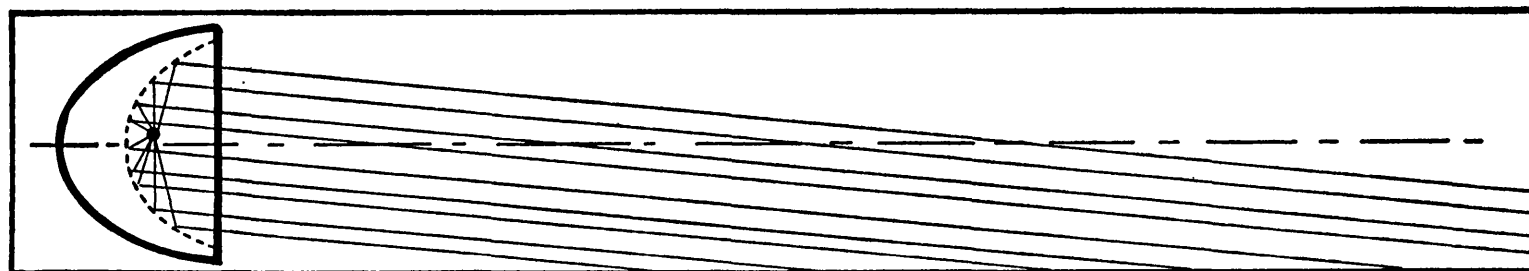


Figure 2.

Parabolic Headlight Reflector with filament placed above the focal center. Note that the beams are projected downwards.

Bifocal headlight bulbs, which have been used during the past few years, were so constructed that one filament was located slightly above the focal center, while the other was slightly below. If we light the filament which is located above the focal center the light rays will be reflected downwards, while if we light the filament located below the focal center, the light rays will be reflected upwards, see Figures 2 and 3.

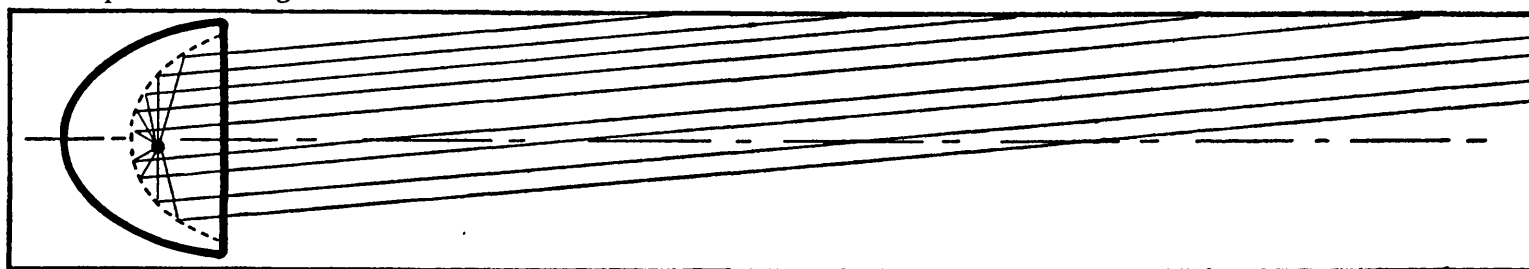


Figure 3.

Parabolic Headlight Reflector with filament placed below the focal center. Note that the beams are projected upwards.

This year we find the same principle employed; however, the bulb has been given a quarter of a turn, and the two filaments are now located to the RIGHT and LEFT of the focal center, instead of above and below it. The same action takes place, only the light rays, instead of being reflected upwards or downwards, are now reflected sideways, or straight ahead. A conventional foot-operated selector switch is still used on Auburn and Studebaker cars, which switch determines which of the two filaments will be lighted, or whether the light rays will be projected to illuminate the center of the road or to the side and illuminate the gutter.

This method of locating the headlight filaments in a vertical plane rather than horizontal is a radical departure from anything that has been done in the past; however, the most novel feature of this new lighting system is the method employed to raise or lower the headlight beams. This is accomplished electrically by using two independent magnets, which impart motion to a small oscillating cam wheel. This mechanism is attached to the back of the headlight reflector.

By referring to Figure 4 it will be seen that the lamp socket is pivoted at the extreme rear end, at the point labeled "P", and that it is held firmly against the cam wheel, "C", by a spring. As cam wheel, "C", is slightly turned, either to the right or left, the lamp socket is lowered or raised. The left hand magnet, "M-1" (as viewed from the back of the headlight reflector), turns the cam wheel clockwise which LOWERS the lamp socket but raises the light beam so that it is projected farther ahead of the car. The right hand magnet, "M-2", turns the cam wheel counter-clockwise, RAISING the lamp socket which, of course, results in lowering the headlight beam. Magnets, "M-1" and "M-2" are controlled by a trigger switch, see Figure 5, located on the instrument board of the car. This switch momentarily makes contact when the handle is either moved up or down.

The usual procedure, when driving, is to set the headlight beam to suit driving conditions and leave it in that position, using the foot selector switch to deflect the headlight beams from the center of the road to the gutter for passing purposes. The action of the magnetic adjusting device is interesting in itself. But one magnet can be operated at a time, and in

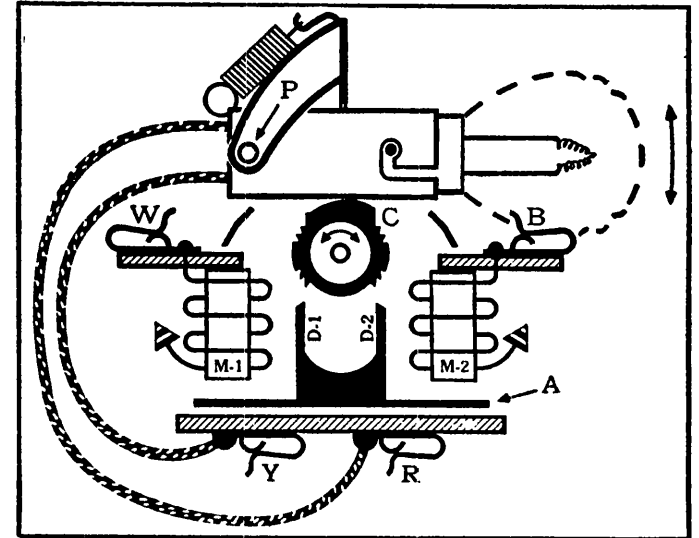


Figure 4.

The magnetic Actuating Device for raising and lowering the light socket.

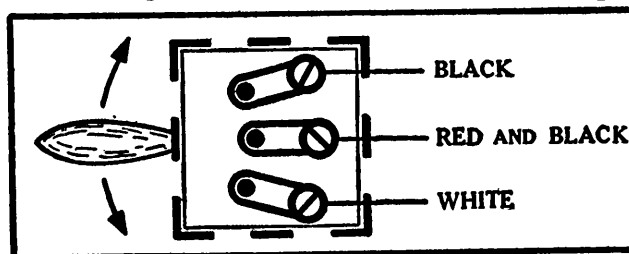


Figure 5.

The Trigger Switch for controlling the headlight magnets.

four wires are attached to the four Farnstock connectors which are a part of the magnetic device. The two upper connectors, mounted just above the magnet spools, are connected to the magnets, while the two lower ones are connected to the filaments in the bulb. On the diagram the four Farnstock connectors are labeled, "W", "Y", "R", and "B" respectively. "W" stands for white, "Y" for yellow, "R" for red, and "B" for black, and designate the color of the wires which should be attached to them.

It is very important that the headlights, themselves, be properly grounded. On some cars trouble already has been experienced because the right headlight assembly does not make a perfect ground connection to the frame of the car. The current passing through the lamp filaments is forced to flow through coils M-1 and M-2 (Fig. 4), and then across the car to the opposite headlight, in order that the filament circuit be completed to ground. This causes the magnetic actuating device to operate when it is not wanted, puts extra resistance in the filament circuit, with a corresponding dimming of the lights, and also will cause the actuating magnetics to become hot and burn out.

making tests of the device it will appear that the armature bar, "A" lifts absolutely straight up and down. This, however, is not true. Because of the "sloppy" arrangement of the armature mounting, which permits it to first lift on the end below the magnet which is attracting it, either dog, "D-1" or "D-2" will engage with the teeth on the cam wheel, thus causing the wheel to turn a notch to the right or left.

Five wires are brought out of each headlight, see Figure 6, their colors being black, green, red, white and yellow. The green wire is attached to the small 3 C.P. bulb used for parking purposes. The other

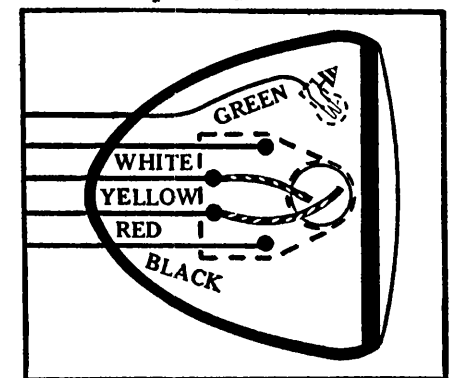


Figure 6.

The Studebaker headlight assembly, showing the BACK of the reflector. The dots represent the four Farnstock connectors.

1934 RIMLESS HEADLIGHTS

Many advanced engineering features have been incorporated in 1934 automobile headlight equipment, which have increased their illuminating characteristics without making it necessary to increase either the size of the headlight shells or the candle power of the bulbs. In addition, improved appearance results through the elimination of the headlight door or lens holding rim. The purpose of this section is to acquaint Service Station Mechanics and Headlight Adjusters with the proper procedure to follow in removing the headlight lenses when bulb replacements are necessary. If these instructions are followed, no difficulty will be experienced in servicing the assemblies; however, if other methods are employed, breakage of lenses and damage to reflectors is certain to result.

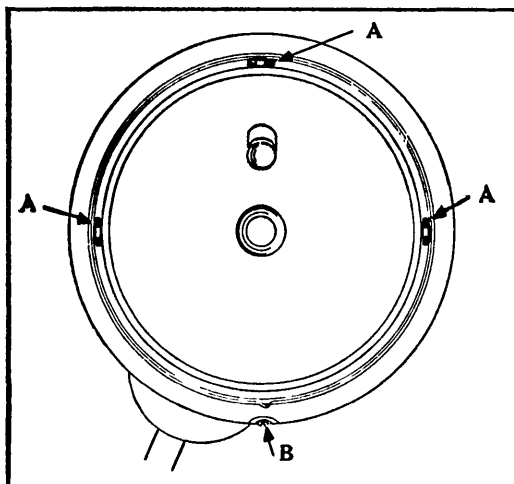


Figure 1.

A Rimless Headlight with Lens and Lens Gasket removed, showing the location of the three reflector spring retaining clips.

On this type of headlight the lenses are held securely in place by spring pressure exerted against the rear side of the reflectors.

Figure 1 shows a front view of the new type rimless headlight with lens and lens gasket removed. The letters "A" designate the three reflector spring retaining clips, while Figure 2 is a cross section showing the relative location of each part of the assembly.

The lenses are locked in place by a single screw located at the bottom of the headlight assembly. Turning this screw in a clockwise, or right hand direction, locks the lens and reflector assembly in place for driving; while to remove the lens, the screw should be turned counterwise, or to the left.

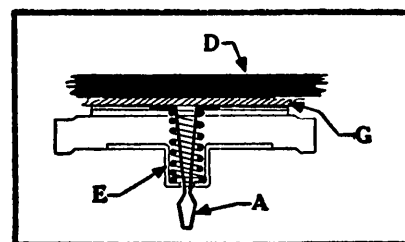


Figure 2.

Cross section of Reflector Spring Retaining Assembly. The parts are:—Reflector "D", Gasket "G", Compression Spring "E", and Spring Retaining Clip "A".

the locking wedge or bracket "C" in the finished or running position. It will be seen that wedge "C" is pressing firmly against the reflector, and is holding lens "D" and gasket "G" firmly together, as a single unit.

Figures 3 and 4 are enlarged sections showing the bottom of the headlight assembly, including the lens and reflector locking screw, designated by the letter "B". Figure 3 shows

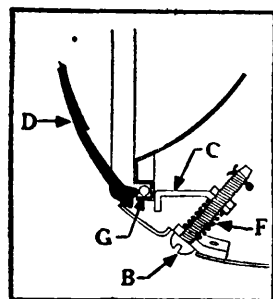


Figure 3.

Section at bottom of headlight, showing Reflector Locking Screw "B" and Wedge "C" in proper position for running.

Figure 4 shows the locking screw "B" and wedge "C" released, and in a position to permit of the removal of the lens.

HOW TO REMOVE THE LENS.

1. Turn the locking screw "B", Figure 4, to the left, until the small cotter pin in the end of the screw is felt to bottom on the wedge nut. (WARNING: Stop turning when you feel the cotter pin touch; otherwise the pin will be sheared off. Our engineers find that on an average about nine complete turns of the screw "B" will either lock or unlock the assembly.)

2. Using the palms of both hands, exert a steady downward pressure on the lens "D", thus forcing the reflector back, and at the same time the lens down towards the bottom of the lamp body. When the bottom edge of the lens

is at the lowest possible position in the bottom of the headlight shell, the top edge of the lens may then be sprung forward so as to clear the lamp body. The lens can then be lifted and withdrawn.

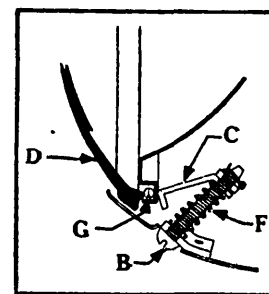


Figure 4.

Section at bottom of headlight, showing Reflector Locking Screw "B" and Wedge "C" released, and in position to remove lens.

HOW TO REMOVE A REFLECTOR.

1. After the lens has been removed next remove Gasket "G".
2. By using a small screw driver (Stanley No. 1010) between the headlight body and the edge of the reflector, at a place close to the three reflector spring retaining clips ("A", Fig. 1), exert a slight outward pressure, and the clips will be withdrawn from the retainer. When all spring clips (three in number) have been withdrawn, the reflector can be lifted from the lamp body far enough to disconnect the light sockets and wires.

HOW TO REPLACE A REFLECTOR.

1. Check the three reflector compression springs ("E", Figures 2 and 5) to make sure they have properly seated in their retaining sockets.
2. Check position of locking wedge or bracket "C", to make sure that it is close up to the cotter pin as shown in Fig. 4. This is important, as the wedge must be in this position when the lens is later replaced.

3. Connect sockets and wires.
4. Place the three reflector spring clips ("A", Fig. 1) in position in the reflector.
5. Start the tips of all spring clips "A" through the holes at the base of the reflector springs, and by using a blunt half-inch screw driver, exert a steady pressure on the top of each spring clip. This will force each retaining spring clip into place, and when all three are snapped the lens gasket should next be replaced.

HOW TO REPLACE THE LENS.

1. Grasp lens with both hands, and insert the lower edge in its proper position at bottom of headlight shell, applying a steady pressure both backwards and downwards while performing this operation.
2. When lens is properly lined up and in the correct position at bottom of the shell, press the top of the lens into position.

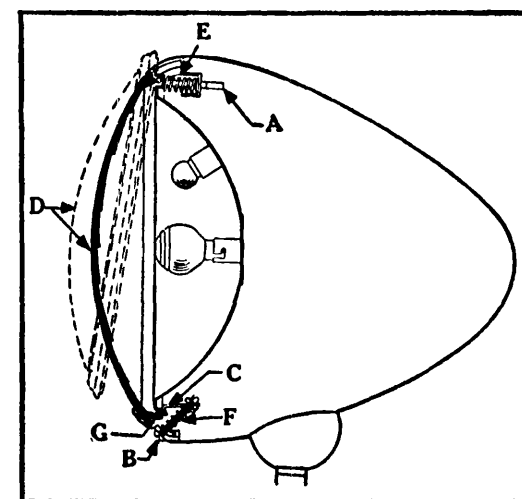


Figure 5.

After pressing the lens backwards and downwards with the palms of both hands, the top of the lens is sprung forward, and then lifted from the headlight body.

3. Center the lens in the headlight shell, making sure that the small nubble on bottom of the lens fits into the alignment slot at bottom of shell.
4. Lock entire assembly in place by turning screw "B" to the right. Figure 6 shows the completed assembly ready for the road.

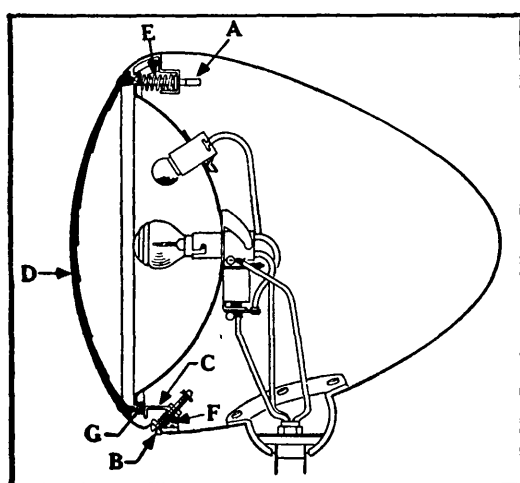


Figure 6.

The completed assembly with all parts in their proper places and Wedge "C" in the locked position.

1934 BARREL TYPE BENDIX DRIVES

Used on Chevrolet, Hudson and Pontiac Automobiles.

Type A-1673 Used on the 1934 Hudson.

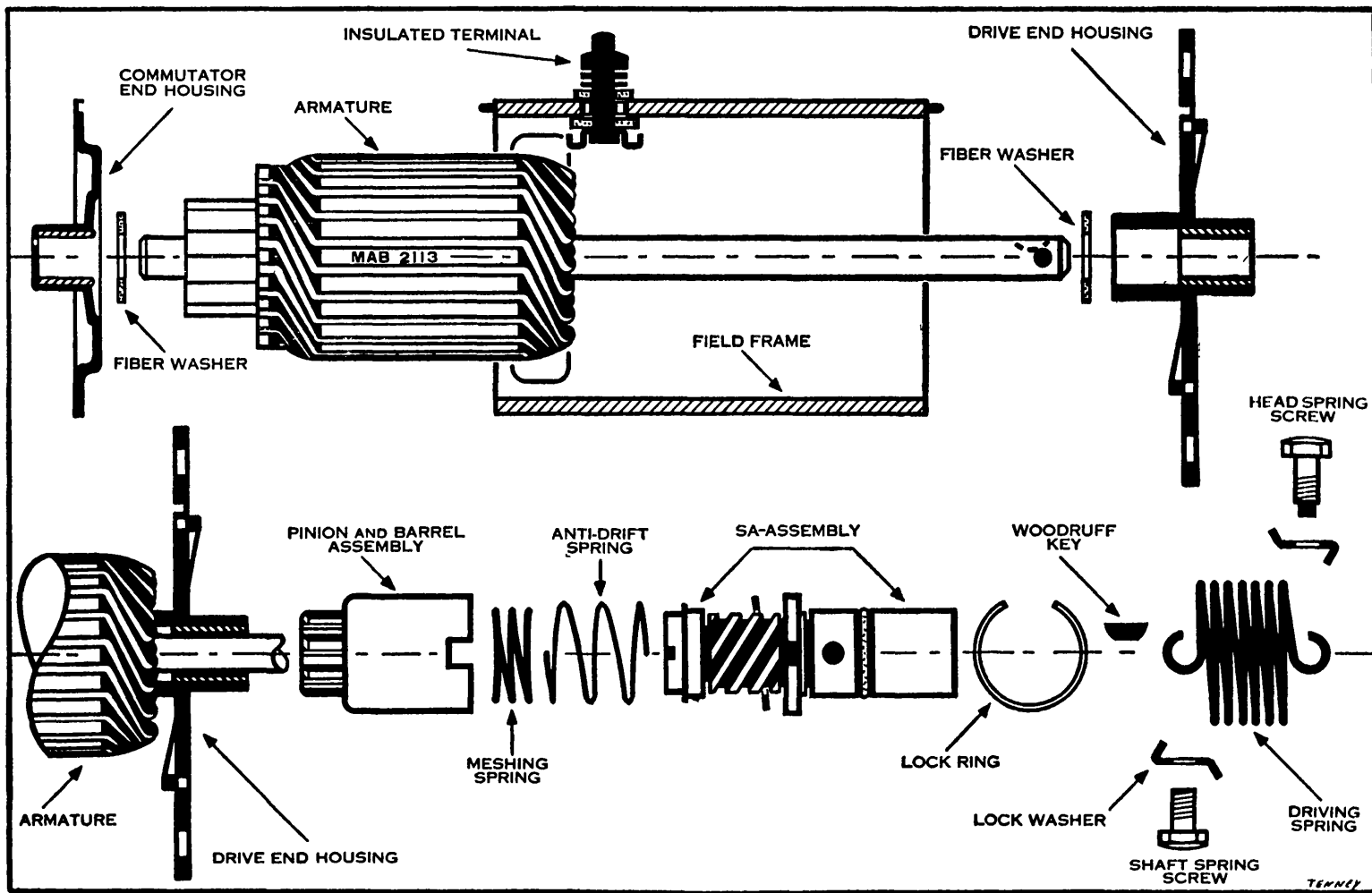


Fig. 1.

Detail of Armature and Parts Assemblies.

NOTE: In assembling starting motor drive end housing to the field frame make sure the bronze bearing in the end housing is in the outside hub.

To remove a barrel type Bendix Drive from a starting motor, the procedure is as follows:—

1. Make sure the pinion and barrel assembly is in the demeshed position, or in other words, that you can turn the barrel assembly backward so that it will "over-run", which results in an audible clicking.
2. Release both the head screw and shaft screw lock washers by bending the "ears" back.
3. Remove both the head and shaft screws, and then slide the driving spring off.
4. By placing the palm of the hand over the outside end of the unit, press the whole assembly towards the starting motor, which will make it possible to remove the Woodruff key found near the end of the armature shaft.
5. Draw assembly from the shaft.

To service either the meshing spring or anti-drift spring it is necessary to remove the pinion and barrel assembly from the SA-assembly. To do this proceed as follows:—

1. Stand the assembly on its gear end, and remove the lock ring by inserting a small, sharp screw driver under the end of the lock ring, which is nearest to a lug recess in the barrel assembly, and then prying the lock ring out of its retaining groove. By exercising care in this operation the ring may be removed without distorting it.
2. The SA-assembly should next be lifted out of the pinion and barrel assembly.
3. Remove the meshing spring which will be found inside the barrel assembly.

IMPORTANT NOTE: With the exception of the anti-drift spring, which can be serviced as a separate part. Bendix engineers do not advise or recommend servicing separately any of the parts of the SA-assembly, which comprises the screw shaft, control nut, stop nut, bronze washer, fibre washer and anti-drift spring.

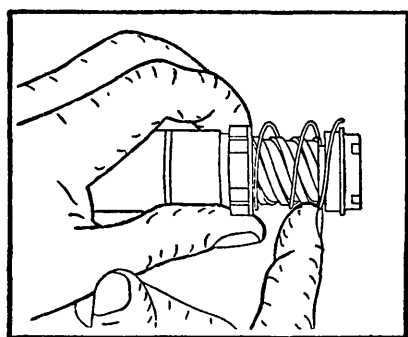


Fig. 2.

Removing the Anti-Drift Spring from the SA-Assembly, showing approximate angle which finger should be held to properly guide end of the spring over the shoulder on stop nut.

To remove the anti-drift spring proceed as follows:—

1. Rotate the control nut to the extreme rear position on the screw sleeve.
2. "Hook" the end of the first finger under the stop nut end of the anti-drift spring, holding the finger at approximately the same angle as shown in Fig. 2.
3. Gently pull the spring away from the stop nut, and allow it to slip over the shoulder on the nut.

After removing the spring, test it for distortion by dropping it into the pinion and barrel assembly, first checking one end and then the other. If the spring falls freely into the barrel, and there are no visible signs of distortion it may be again placed in service; however, when making this test, if there are signs of distortion, the spring should be condemned and replaced.

How to Reassemble a Barrel Type Bendix Drive.

To replace anti-drift spring on the SA-assembly proceed as follows:

1. Push the screw sleeve forward its full length of travel, making certain that the bronze washer is in place against the control nut, and that the control nut is at the extreme rear of the screw sleeve.
2. Just catch the end coil of the anti-drift spring over the stop nut, see Fig. 3.
3. Pull the screw sleeve back its full length of travel, and with a rotary motion rethread the anti-drift spring onto the screw sleeve until it presses against or abuts the bronze washer. By using the first finger as a guide, see Fig. 4, lastly ease the outer end of the spring over the stop nut shoulder.

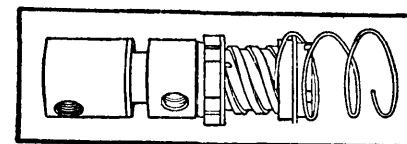


Fig. 3.

When replacing the Anti-Drift Spring first catch the end coil over the stop nut.

How to Reassemble the Pinion and Barrel Assembly to the SA-ASSEMBLY.

1. Stand pinion and barrel assembly on its gear end, and drop the meshing spring into place in the barrel assembly.
2. Screw the control nut about one-half turn forward on the screw sleeve, at the same time making certain that the end coil of the anti-drift spring is not hooked over, or wedged between the bronze washer and control nut.

NOTE: If the anti-drift spring is correctly positioned, and there are no burrs on either the control nut lugs or the barrel slots, the barrel will slip into place easily. DO NOT USE FORCE.

3. Replace lock ring by inserting one end in the retaining groove, and then "feeding" it around. By using a screw driver, force the ring out into place until it seats securely to the FULL DEPTH of the groove.

NOTE: Recheck this operation, as it is very important that the lock ring be in its proper position. Make sure that the pinion and barrel assembly is free to move rotarily for its full length of travel on the screw sleeve, and that when in the full demeshed position, correct indexing occurs, which will be evidenced by an audible click. The assembly also should automatically rethread itself on the screw sleeve by a very slight turn in the opposite direction.

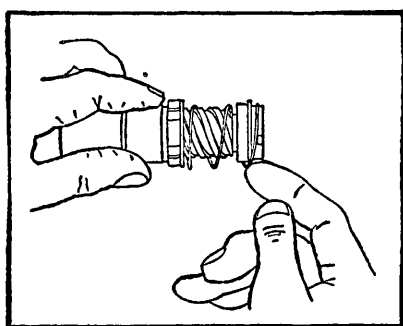


Fig. 4.

By using the first finger the outer end of the Anti-Drift Spring should lastly be eased into place, as shown.

To reassemble drive on starting motor armature proceed as follows:—

1. Slip the unit on the armature shaft.

IMPORTANT! Due to the limited length of threads which may be in engagement when the pinion assembly is in the demeshed position, do not strike the pinion or barrel as the ends of the triple threads may become damaged; therefore, never attempt driving the assembly on the armature shaft when reassembling. If binding exists, investigate the cause and correct it.

2. Turn pinion and barrel assembly to the demeshed position.
3. After lining up the keyway in the drive head with keyway in armature shaft, press entire assembly towards the starting motor sufficiently far so as to permit the Woodruff key to be inserted.

4. Pull assembly back over key until the hole in the drive head lines up with hole spotted in the armature shaft.
5. Replace driving spring, and bolt it into place with the head and shaft spring screws, using new, genuine Bendix lock washers to lock the screws.

IMPORTANT! Free and unrestricted longitudinal movement of the forward part of the drive is very important, due to the pinion riding directly on the armature shaft. Any chafing or burring at this point will restrict this movement, and may result in meshing failure. If such restriction occurs smooth with a fine file followed by emery cloth; thoroughly clean; and relubricate the shaft where the pinion rides, applying a light film of Gredag No. 31½.

Should meshing failure occur, inspect assembly for excessive lubrication. The examination should be made after first removing the armature and drive integrally from the starting motor. Rotate the pinion and barrel assembly forward to its extreme meshed position, or until the screw sleeve has moved back the full extent of its travel, thereby exposing the maximum amount of triple threads. Surplus oil or grease on the threads retards normal drive action because of congealing, particularly in cold weather. Use a dry cloth to clean the threads. If they appear to be gummy, apply a little kerosene on a cloth. In the event excessive oil or grease is found, rotate the pinion barrel back and forth several times, repeating the wiping operations until the surplus is removed.

With the unit in the fully demeshed position, next examine that portion of the armature shaft where the pinion rides. Excessive oil or grease at this point also should be removed, in the manner just described.

After thoroughly cleaning, relubricate the drive sparingly with very light engine oil, such as SAE-10-W. A few drops on the screw sleeve and several drops on the armature shaft are sufficient. The armature shaft, where the pinion rides, is initially lubricated with Gredag No. 311½. This exact type of lubricant, in small quantities, is preferable; however, 10-W oil is mentioned because it is more often available. Before reassembling the armature in the starting motor, move the pinion barrel back and forth through several cycles to properly distribute the new lubricant between the wearing surfaces.

DO NOT APPLY GREDAG TO THE SCREW SLEEVE TRIPLE THREADS. DO NOT WASH THE ENTIRE DRIVE IN KEROSENE OR GASOLINE—This not only is unnecessary but undesirable as the necessary lubricant, originally placed under the screw sleeve, will be washed off, and it is impossible to again replenish this lubricant once the assembly has left the factory.

How to Install a Headlight Adjusting Station

This most valuable, as well as interesting section was prepared by Mr. Frank A. Pim of Los Angeles, Calif., a recognized authority on the subject of automobile lighting, and former consulting illuminating engineer for the Motor Vehicle Divisions of the States of California, Oregon, and Washington and other states.

Proprietors of many Service Stations and Garages throughout the country have long aspired to properly equip their establishments to render profitable headlight adjusting service, and to receive official approval from the State authorities, which would permit them to perform this type of work. It is becoming generally recognized that there is need for more and better equipped headlight adjusting stations. This fact was forcibly brought to the attention of the Society of Automotive Engineers at a recent meeting, held at the Book-Cadillac Hotel, Detroit, Michigan, when Mr. R. M. Falge, Research Engineer for the Guide Lamp Corporation, presented an interesting paper entitled, "Modern Headlighting Requirements". Mr. Falge says, "The headlamp service situation presents a peculiar problem. Here we see a potential market, involving millions of dollars in profit every year almost totally neglected in all but a few states. In service stations we see any number of headlamps with cracked lenses, dirty reflectors, and darkened bulbs, obviously in need of attention. Closer observation discloses low voltage and improper adjustment. In fact, we have no difficulty in finding something seriously wrong with the headlighting on the large majority of the cars which have been in service a year or more."

It is the purpose of this article to outline the procedure which should be followed when establishing a headlight station, and to offer suggestions for laying out the floor space, screen set-up, etc., that the enterprise may be embarked upon with a minimum amount of trouble.

LOCATING THIS NEW DEPARTMENT.

The selection of the space to be used for headlight adjusting is one which should be given careful consideration. It is not necessary to use the lightest part of the shop, as a dim or semi-dark location, is in a way, to be preferred. There are, however, certain limiting factors and, taken in the order of their importance, they are —

First — Size of floor space.

In length there must be available at least forty feet. Twenty-five feet of this, the distance from the official chart to the headlights, will be used for the positioning of the light beams upon the chart, while the remaining fifteen feet is reserved for the car. In width there should be at least twelve feet, as there should be sufficient space for the operator to open the car doors and conveniently operate the lighting switches and controls.

Second — The condition of floor space.

The floor space **MUST BE LEVEL**, and the smoother or better the floor surface, the more satisfactory the finished layout.

Third — Accessibility.

This requisite, while third on the list, from a point of view of essentials is really first of importance from a commercial standpoint. If your adjusting station is conveniently located, and cars can be positioned with a minimum expenditure of time, daily production will be increased, with a corresponding increase in revenue. Again, not only should the space be easily accessible but, if possible, an exit should be provided that the cars, when adjustments are completed, may proceed as headed, rather than be backed, which always results in loss of time, congestion, and confusion.

OFFICIAL HEADLIGHT ADJUSTING CHART.

The official headlight adjusting chart, shown in Fig. 1, (on next page) was developed by the American Automobile Association of Washington, D. C., in collaboration with illuminating engineers of the U. S. Bureau of Standards and, as a convenience to you, are now being sold by the Standard Engineering & Publishing Co. Because of its accuracy and simplicity of operation, the chart has received official endorsement in the majority of the States.

A wooden frame, fifty-two inches high and seventy-two inches wide should be constructed, and the chart mounted upon it, care being exercised to see that the bottom or "floor level" line exactly lines up with the bottom edge of the wooden frame. The frame, with chart, should next be located "plumb, square and perpendicular" at the far end of the light adjusting space, with the lower edge of frame resting on the floor. Use an accurate level and plumb-bob in determining its position.

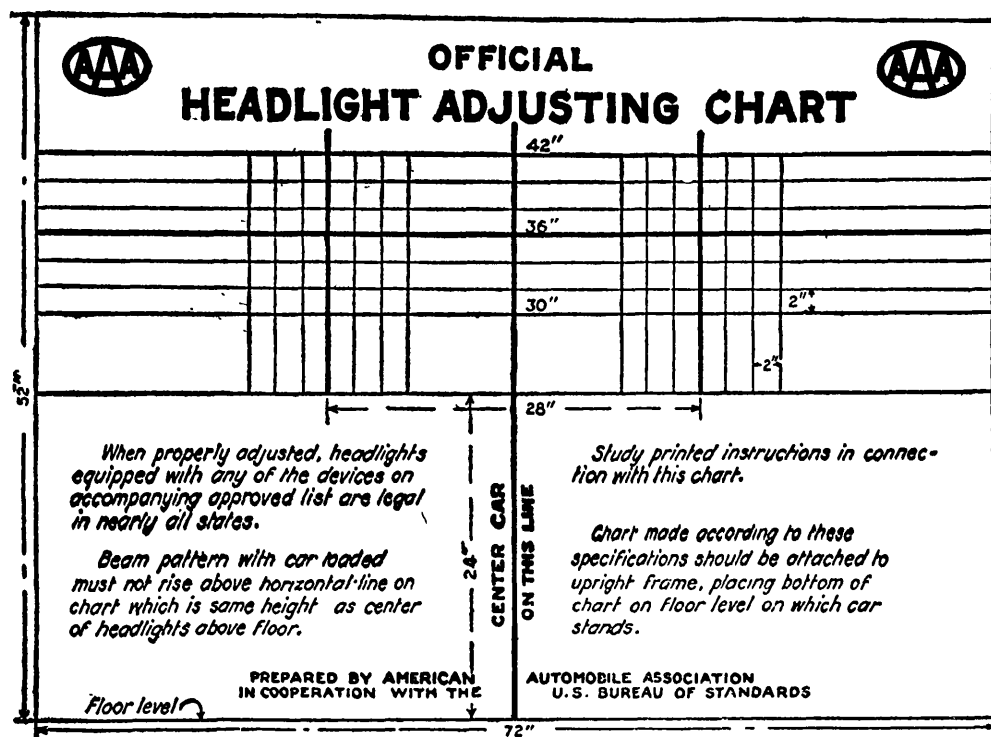


Figure 1.

The Official AAA Headlight Adjusting Chart.

Courtesy American Automobile Association, Washington, D. C.

For example: If the perpendicular distance from the line to the floor, measured at the center of the front hub cap, should prove to be fourteen inches, then, if the floor is level, the bottom of the official chart, which is resting on the floor, should be just fourteen inches from the string level.

Follow the same procedure on the opposite side of the car, and if the floor is level in a direction at right angles to the car, the two measurements at the chart, taken between the string and the floor, will be the same. Should these measurements show that the floor is not level, arrange with a mason to have a thin surface layer of concrete applied, which will overcome the difficulty.

At this time we wish to emphasize the importance of exercising extreme care in checking the floor level, as well as determining the chart position. State officials will most surely verify its location to make sure that it is correct before licensing your station to perform official headlight adjusting.

PREPARATION OF FLOOR.

Thoroughly wash the entire floor space with Oakite and hot water or, possibly, with gasoline and sawdust, removing all surface accumulations of caked dirt and grease, using a floor scraper or large putty knife.

PAINTING THE FLOOR.

Figure 2 (on next page) shows diagrammatically, the arrangement of the floor lines, and has necessary dimensions from which to work. The heavy black lines will, in reality, be white lines on your floor. Before applying the white paint the floor surface beneath the lines should first be treated to a preparatory coat of banana oil, and a period of at least fifteen hours allowed to elapse, that it may become thoroughly dried. The white lines may then be drawn, using "American White Enamel" (not white lead). Two coats should be applied, allowing drying periods of at least twenty-four hours between coats. To insure durability a thin coat of banana oil may lastly be applied over all.

WHEEL-GUIDE RUNWAY.

It, of course is understood that the floor lines are simply for the purpose of correctly aligning the car to be adjusted. When a car is properly positioned, according to these lines, the operator may proceed with the details of headlight adjusting with the assurance that the front of the car is parallel with the official chart. It frequently happens, however, that a motorist will experience difficulty in quickly guiding a car to the correct spot for adjusting. To overcome this objectionable feature, and to speed up production, we recommend that either a single or a double wheel runway be constructed.

While this, eventually, will be the permanent location of the chart, for the time being let it be a temporary installation, as the chart can be used to determine if the floor is absolutely level both ways. To do this place an automobile in the proposed adjusting position, with the headlights twenty-five feet away from the chart, and the lenses parallel with the chart surface.

IMPORTANT! Check the tires on all four wheels to make sure they are all the same size, and that they are evenly inflated.

Tie a loop in one end of a chalk-line, making the loop large enough to slip loosely over a rear hub cap, and so that it will self-center when tension is placed on the line. Pass the line forward, parallel to the car, to a position close to the chart. After applying tension to the line, raise and lower it until the line cuts across the exact center of the front hub cap. Have an assistant accurately measure the perpendicular distance from the center of the front hub cap to the floor, and if the floor is level, fore and aft, the distance from the floor to the chart end of the taut line will be exactly the same.

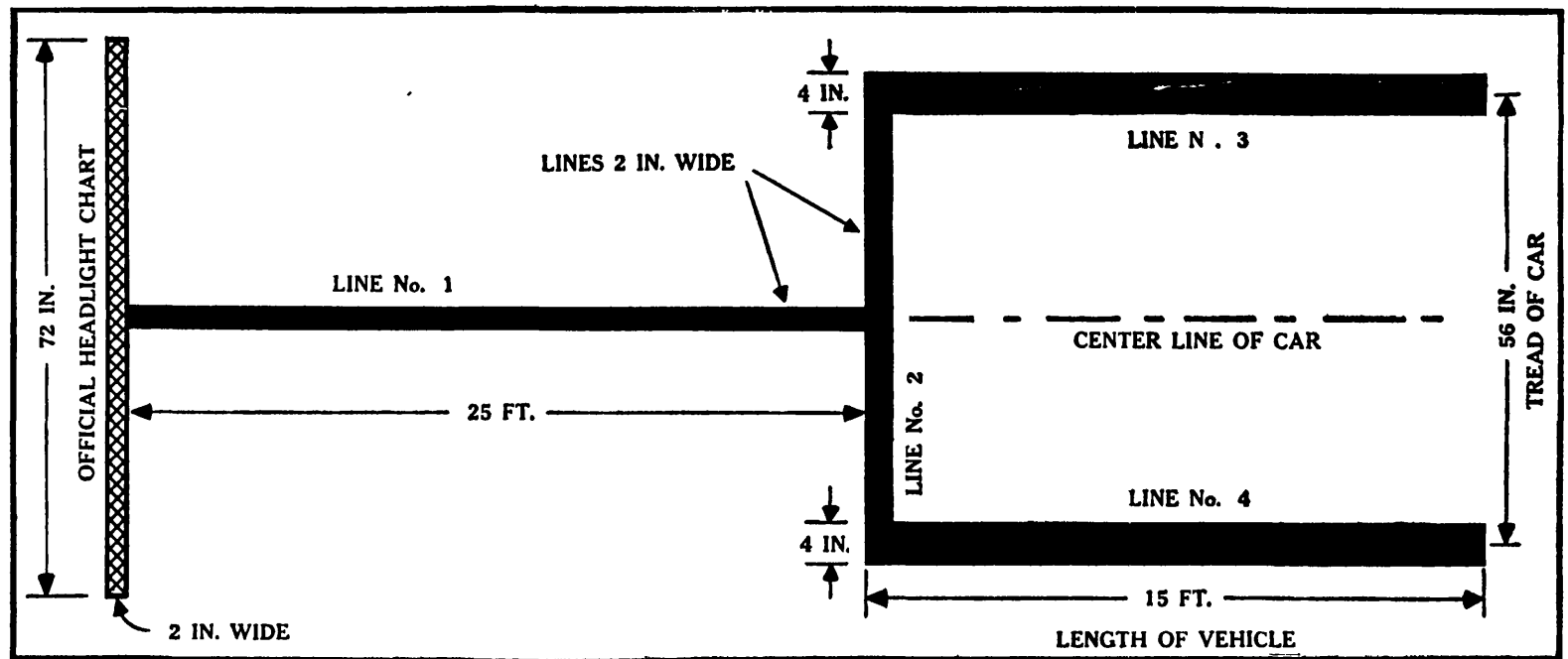


Figure 2.

A diagrammatic drawing, with dimensions, showing the painted floor lines. (This is not a scale drawing).

Figure 3 shows a practical runway which fully meets all requirements. To build this runway procure two, ten foot lengths of two by four, and have them planed on all sides. It is well to slightly bevel the top inside edges (which will come next to the tires) to avoid tire damage. Round off the entrance ends of the runway to make it easier for the wheel to enter the groove. Fasten the two pieces in such a manner that the distance between inside edges will be at least four inches, or possibly more, if many of your customers use "doughnut" tires. Use strap iron, size one and one-half by five-sixteenths, countersunk and screwed into the bottom of the side members, that the finished runway may set flat on the floor.

The runway may be either attached permanently to the floor, or made portable, so that it can be removed or set to one side. If the latter method is preferred, drill two holes in the floor, near the ends of the side members, deep and large enough to take six inch lengths of one-half inch pipe, which should be inserted in the floor holes. Half inch dowel pins should be affixed to the bottom of the side members in such a manner that they will line up with the holes in the pipes thus placed in the floor.

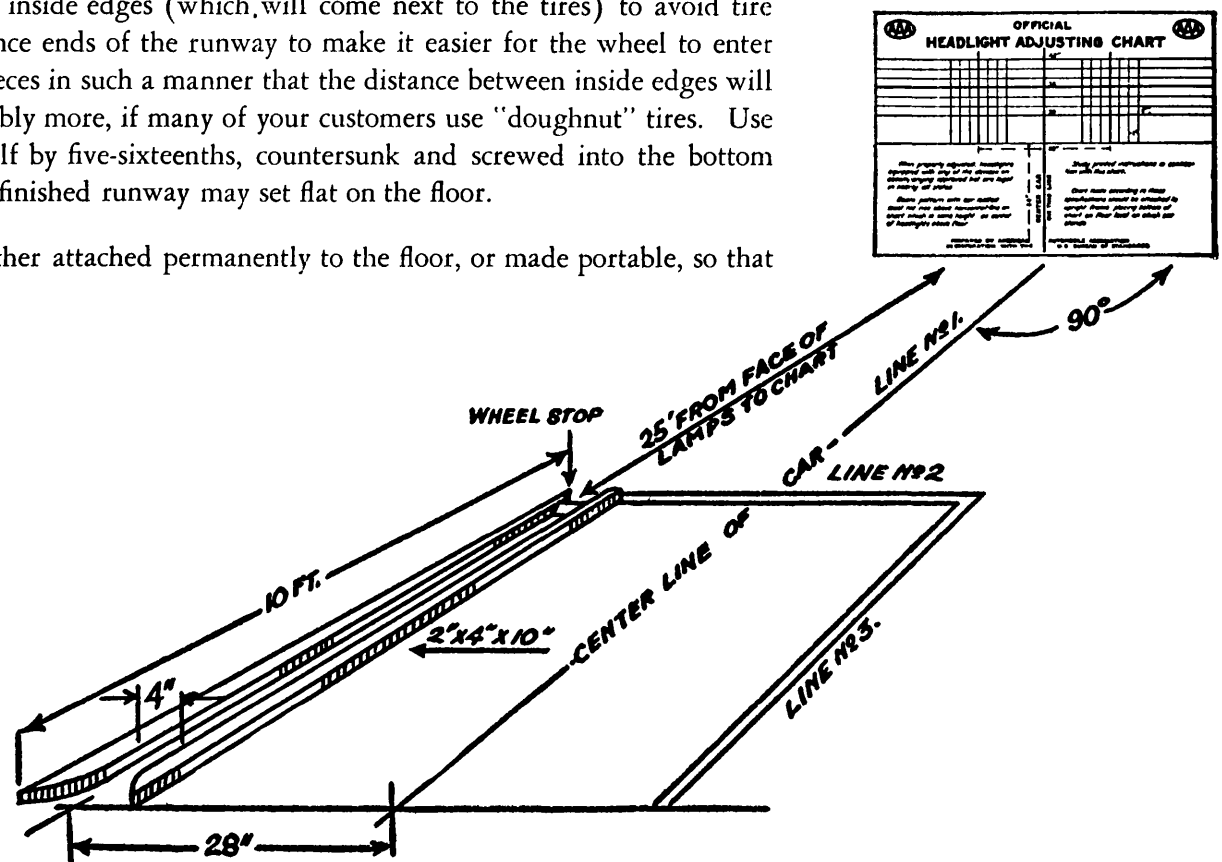


Figure 3.

A practical runway for quickly positioning the car to be adjusted.
Courtesy American Automobile Association, Washington, D. C.

LIGHT TUNNEL ARRANGEMENT.

Headlights cannot be properly adjusted unless the official chart is sufficiently shaded from the sunlight. A suitable hood or tunnel must be constructed, which should be seven feet wide and six and one-half feet high. It must extend forward from the chart a distance of not less than ten feet. The maximum distance, however, will depend largely upon the lighting conditions within each individual garage.

IMPORTANT! The tunnel must be constructed of such materials, and in such a manner, so as to completely conform with all local and State building regulations. It should be painted inside with a dull or flat black. Do not use a white paint for this purpose.

MISCELLANEOUS EQUIPMENT.

For the convenience of the operator, and to facilitate the headlight adjusting work, a portable bench or table, mounted on castors, should be provided. The most convenient place for this is near to the wall, about opposite the front of the car to be adjusted. A bench of this sort provides a place to lay headlight lenses, reflectors, etc., as well as tools, while the actual adjusting work is being performed. Shelves or lockers should be provided for keeping a supply of new reflectors, lenses, lamp bulbs, wire, etc., as, if they are conveniently located they will save many steps, and expedite the various operations.

SPECIAL TOOL EQUIPMENT.

The following list of special headlight adjusting tools should be readily available to the operator.

Pair clean cotton gloves.

Screw Drivers: Eight inch, six inch, and four inch.

Lamp socket screw driver (Stanley No. 1010).

Socket Wrenches: Set S.A.E. standard one quarter inch to five-eighths.

Set Midget wrenches, Hinsdale No. 11M (machine screw size).

A strong bending iron or eighteen inch monkey wrench.

Yardstick.

"Red Devil" glass cutter.

Circular glass cutter.

Bottle denatured alcohol.

Bottle LePage's glue.

Pound powdered lamp black.

Pound absorbent cotton.

One-half pint bottle Shellac or Gasket Cement.

Ball quarter-inch diameter woven or braided cord.

Box assorted cork or paper headlamp gaskets.

Camel's hair brush (one inch wide).

Voltmeter (scale 15-0-15).

NOTE: Many of the more progressive Service Stations are already equipped with portable Analyzer units which, of course, have an accurate voltmeter mounted on them. If convenient, use the Analyzer meter for headlight adjusting work.

HEADLIGHT ADJUSTING.

Place the car to be adjusted exactly twenty-five feet from the official headlight adjusting chart or, in other words, see that the headlight lenses are directly over Line No. 2, Fig. 2. Glance at the four wheels to see if the tires are more or less evenly inflated, and that the wheels line up with lines No. 3 and No. 4. The lighting switch should next be placed in the "bright" position, and a superficial inspection made in which the condition of the lenses should be observed (watch for cracked or loose lenses), and note the brightness or intensity of the two lamps to see if they are approximately the same. Quite frequently we find cars on which one headlight has the proper brilliancy, while the other burns dimly, or just barely glows. This may be because the headlights are equipped with different candle power bulbs, or there may be resistance in the weaker headlight circuit, either the result of a poor connection or a poor ground. The most accurate method in locating this trouble is to use a voltmeter, making a voltage drop test between the feed wires and ground, or the headlight shell and ground. This condition should be corrected before proceeding farther with the adjusting work.

Remove the two headlight lenses, and after turning the switch "off", inspect the filaments in order to determine if they have sagged or have become distorted. Remove the bulbs from the headlight sockets, and slowly rotate them by hand. A visual inspection will readily show whether the filaments have the proper axis alignment. Bulbs which have become blackened, or which are loose in their base, should promptly be condemned and replaced. (See next page for illustrations.)

IMPORTANT! Always use gloves, or otherwise cover the hands, when removing or replacing headlight bulbs. Not only will you, in this way, avoid the danger of cuts, should the bulbs break but, that which is most important of all, you will not leave fingerprints.

Always inspect the reflectors for dullness or "fog", scratches, rusts, dents, or other imperfections. To produce the proper lighting effect the reflecting surface of all reflectors must be highly polished, and free from dirt or imperfections.

WARNING! Never touch the surface of a reflector with anything but a camel's hair brush, and when using it always brush the reflector in a direction from the center outwards, never around the reflector.

If you find the reflectors to be scratched, dull, rusty, or brassy, send them out to be resilvered, not nicked. If you find a dented reflector, discard it at once, and replace it with a new one. Never undertake to pound dents out of headlight reflectors. In making replacements of either reflectors or lenses always use genuine parts.

Figures 4, 5, and 6 show types of defective bulbs which should be watched for when making this inspection.

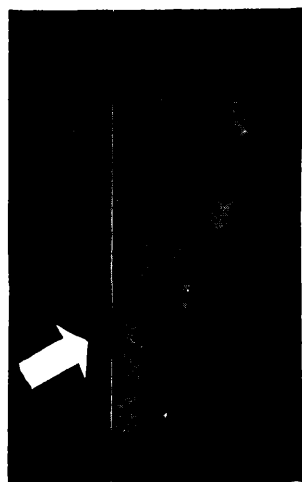


Figure 4.

CROOKED BASE

A lamp with a crooked base cannot be focused properly. The result is a distorted and misdirected light beam which is glaring to the approaching driver. It spoils the lighting performance of any well designed headlamp unit.



Figure 5.

FILAMENTS TOO CLOSE

Passing beam cannot be depressed sufficiently to eliminate glare, and is a menace to safe night driving. The arrow points to a defective bulb while the bulb to its right is perfect in every detail.

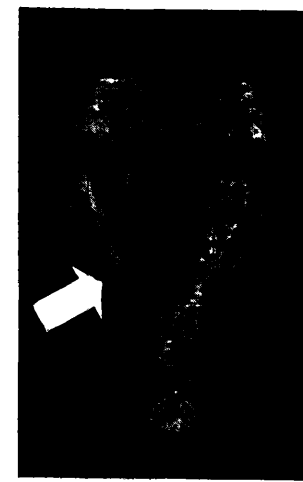


Figure 6.

FILAMENT NOT CENTERED IN BULB

The lighting results from such a lamp are about the same as for a lamp with a crooked base—it is difficult or impossible to focus it in the reflector.

Occasionally a reflector which is but slightly fogged may be restored to its original brilliancy in the following manner:—

Dampen a tuft of absorbent cotton with denatured alcohol, and dip it in powdered lamp black. Apply this to the surface of the reflector, working from the center outwards, until it is completely covered. After the alcohol has evaporated remove the lamp black with a clean tuft of cotton, using the same stroke, from the center outwards. Ribbed or configured reflectors should be polished in the same manner as explained above, with the one exception that the strokes are made parallel with the ribs or flutes.

Glass lenses may be cleaned with alcohol and lamp black; however, if very dirty, soap and water should be used. After the lenses have been thoroughly cleaned avoid touching the inside surface with the bare hands.

Before replacing headlight rims and lenses make sure the rims are free from dents, and that they have the proper shape to fit the lamp shell. On many of the 1933 and 1934 automobiles the headlight lenses are not interchangeable, but must be installed according to the marking "right" and "left", found at the top of the lens. This, likewise, is true of headlight doors or rims which, also, are not interchangeable.

Gaskets are always used to exclude dirt and water, and care should be exercised to see that the gaskets are in a serviceable condition, and in their proper place. Should the gaskets appear to be damaged or defective, by all means see to it that they are replaced.

In the final assembly work of fitting the rims and lenses to the lamp shell, make doubly sure that the rims are securely and permanently locked in place, before permitting the car to leave the floor. Many stations have been forced to make free headlight replacements because this detail was slighted, and the headlight rims, with lenses, dropped from the car when it was put in service.

POSITIONING THE BEAMS ON THE CHART.

With the lights completely reassembled we are now ready to perform the actual focusing operations.

IMPORTANT! Practically all modern automobiles are equipped with bifocal or double filament bulbs. Within the past year many filament lighting combinations have been developed to meet special passing requirements, etc., with a result that a headlight adjuster must exercise special care in determining which of the two filaments in the two headlights are burning at the same time. Always bear in mind that when the two filaments are located in a horizontal plane, or one above the other, the lighting of the lower filament results in a high beam, while the lighting of the top filament results in a low depressed beam.

Headlights should always be focused in the high beam position. See to it that both headlights are delivering a high beam.

NOTE: Certain 1934 models of the Auburn and all 1934 Studebaker automobiles employ two filament bulbs, but use them in a position in the light socket which is ninety degrees, or a quarter of a turn different from previous practices. On these cars the change from one filament to the other deflects the light beams from the center of the road to the gutter. Provision, however, is made for high and low beams by the use of a magnetic device located in the headlight itself. The switch which controls the magnet is on the instrument board, which means that not only must a mechanic make certain that the headlights are in the high position but also that the foot selector switch is in a position to throw the light beams straight ahead and not towards the gutter. For full and complete details on this new lighting system see section entitled, "1934 Auburn and Studebaker 'Control Beam' Headlights".

With both headlights delivering their high beams you will observe that there are two bright spots of light showing on the chart. Because of the design of the flutes or ribs on the lenses, these light spots will be oblong or ellipsical in shape, rather than round. By turning the screw or other focusing device, which moves the entire lamp socket forwards or backwards, the operator should find the position which results in the most concentrated beam, and the one having the sharpest "cut-off" on the top. When making these adjustments one headlight should be covered while working on the other.

Many of the 1934 automobiles are using fixed or prefocused bulbs, see Figure 7, which require no adjustment other than aiming the headlights. These bulbs can be installed in but one position, because the hold-down lugs are unevenly spaced. When replacing bulbs of this new type make sure that all three hold-down lugs enter the slots in the bulb base. The bulb should then be turned to the right, so that the lugs are in the extreme end of the slots. Make certain that the bulb seats squarely, and is securely held in place.

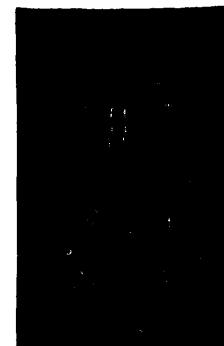


Figure 7.
The new Prefocused Headlight Bulb.

The next operation is to measure the distance from the floor to the center of either headlight, and adjust the entire headlight assembly upwards or downwards until no portion of the main beam rises above a line on the chart four inches below this measurement. The reason for adjusting the top of the beams on the chart to four inches below the center of the headlights is because of the fact that the car is not carrying a load. The four inches will compensate for the tip up of the headlights, due to the loading.

The horizontal distance between the centers of the two headlights should next be measured. Vertical lines are provided on the official chart, and we must determine which pair, equally spaced each side of the center line, is the same distance apart as the centers of the headlights. After aiming the headlights to the correct up and down position the lights should next be aimed to the right and left, so that the pattern on the chart, from each light, will be equally divided by the proper vertical line.

When adjustments on both headlights have been completed place a straight edge across the fronts of both lights, and ascertain if they are square with one another, and with the axis of the car. If corrections are necessary, adjust by changing the position of headlamp mounting nut until both lamps are in line.

The final operation is to polish or clean the external parts of the headlights in order to remove finger or hand prints.

NOTE: *Mr. Frank A. Pim has kindly offered to still further assist you in establishing your Light Adjusting Station, should additional information or instructions be desired. Address Mr. Pim at 1651 Winona Blvd., Hollywood, Calif.*

1934 Valve and Ignition Timing Specifications

Compiled by Weidenhoff Engineers for use with
Weidenhoff Motor Gauge

1934 Passenger Cars	Adapter	Rod	Stroke	Ignition Timing	Before or After T.D.C.	Spark Retard, Advance or Set	Intake Valve Opens	Before or After T.D.C.	Firing Order	Valve Clearances				Breaker Contact Separation	Spark Plug Gap (Ins.)
										Timing		Running			
										Int.	Exh.	Int.	Exh.		
AUBURN 652-X.....	114	42	4¾	.004	B T C	Set	.010	B T C	1-5-3 6 2 4	.012	.012	.006	.008	.020	.025
" 850-X.....	105	5	4¾	.004	B.T.C.	Set	.010	B T C	1-6-2-5 8-3 7-4	.012	.012	.006	.008	.017	.025
" 850-Y.....	114	42	4¾	.004	B T C	Set	.010	B T C	1-6-2-5 8-3 7-4	.012	.012	.006	.008	.017	.025
" 12-265.....	113	19	4¾	.044	B.T.C.	Adv	T D C.	.....	{ 1L-2R-5L 4R-3L 1R- 6L 5R-2L 3R-4L-6R	.015	.015	.010	.010	.018	.025
AUSTIN L.....	104	8	3	.020	B T C	Adv	T D C.	.....	1 3 4-2	.003	.004	.003	.004	.020	.030
BUICK 40.....	113	31	3¾	.002*	B.T.C.	Set	.005	B.T.C.	1-6-2-5 8-3 7-4	.....	.....	.008	.008	.015	.023
" 50.....	113	38	4¾	.018*	B.T.C.	Set	.010	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.008	.008	.015	.023
" 60.....	113	31	4¾	.049	B.T.C.	Set	.012	B.T.C.	1-6-2 5-8-3-7-4	.004	.004	.008	.008	.015	.023
" 90.....	113	31	5	.044	B.T.C.	Set	.009	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.008	.008	.015	.023
CADILLAC 855-D.....	104	42	4-15/16	.012	B.T.C.	Set	.015	B.T.C.	1-2 7-8-4-5-6-3	.006	.010	.006	.010	.015	.026
" 870-D.....	113	33	4	.008	B.T.C.	Set	T.D.C.	.....	1-4-9-8-5 2-11-10-3-6-7-12	A	A	A	A	.022	.026
" 452-D.....	113	33	4	.008	B.T.C.	Set	T.D.C.	.....	{ 1-8-9-14-3-6-11-2-15- 10-7 4-13-12-5-16	A	A	A	A	.016	.026
CHEVROLET Master.....	113*	33	4	.035	B T C	Set	.008	B T.C.	1 5 3-6 2 4	.010	.010	.006	.013	.018	.032
" Standard.....	113*	19	3½	.030	B T C	Set	.008	B T.C.	1 5 3 6 2 4	.010	.010	.006	.013	.018	.032
CHRYSLER CA-6; CB-6 (Cast Iron Hd.)	114-103	42-12	4½	T.D.C.	.....	Set	T D C.	.....	1 5 3 6 2-4	.010	.010	.005	.007	.020	.025
" CA-6; CB-6 (Aluminum Hd.)	114-103	42-12	4½	.004	A T C	Set	T D C.	.....	1 5 3 6 2 4	.010	.010	.005	.007	.020	.025
" CU (Aluminum Hd.)	114-103	42-12	4½	.015	A T C	Set	.002	B T C.	1 6 2 5 8 3 7 4	.011	.012	.005	.007	.018	.025
" CV Imperial (Aluminum Hd.)	114-103	42-12	4¾	T D C.	.....	Set	.002	B.T.C.	1 6 2 5 8 3 7 4	.011	.012	.005	.007	.018	.025
CONTINENTAL Beacon..	104	2	4	.017	B T C	Set	T D C	.....	1 3-4-2	.010	.010	.008	.008	.020	.025
DESOTO SE.....	114-103	2-12	4½	.004	A T C	Set	T D C	.....	1-5-3 6 2 4	.010	.010	.005	.007	.020	.025
DODGE DR (Cast Iron Hd.)	114-103	42-12	4¾	.002	A T C	Set	.014	A T C.	1-5-3 6 2-4	.011	.012	.005	.007	.020	.025
" DR (Aluminum Head)	114-103	42-12	4¾	.009	A T C	Set	.014	A T C	1-5-3 6 2 4	.011	.012	.005	.007	.020	.025
" DS (Aluminum Head)	114-103	42-12	4¾	.009	A T C	Set	.014	A T C	1 5 3 6 2 4	.011	.012	.005	.007	.020	.025
DUESENBERG J	104	8	4¾	.049	B T C	Adv	.015	B T C	1 6 2 5 8-3 7 4	.025	.025	.025	.025	.024	.025
FORD V-8.....	104	40	3¾	.006	B T C	Adv	.028	B T C.	1-5-4-8-6-3-7-2	.013	.013	.013	.013	.014	.025
FRANKLIN 18-C															
" "Olympic"	113*	6	4¾	.015	B T C	Adv	.308	A T C.	1 4 2 6 3 5	.007	.007	.007	.007	.020	.025
" 19-B "Airman"	113*	6	4¾	.015	B T C	Adv.	.308	A.T.C.	1 4 2 6 3 5	.007	.007	.007	.007	.020	.025
GRAHAM Six	102	2	4½	.006	B.T.C.	Set	T D.C.	.....	1 5 3 6 2-4	.012	.012	.010	.010	.018	.025
" Std. & DeLuxe 8.	102	40	4	.003	B.T.C.	Set	T D.C.	.....	1-6-2 5 8-3-7-4	.012	.012	.010	.010	.018	.025
" Super-Charged 8	104	40	4	.015	B.T.C.	Set	T D.C.	.....	1 6 2 5-8-3-7-4	.012	.012	.010	.010	.018	.025
HUDSON 8.....	114	44	4½	T D C.*	.....	Set	.040	B T C.	1 6 2 5 8 3-7-4	.010	.010	.006	.008	.020	.022
HUPMOBILE 417-W.....	104	5	3¾	.016*	B T C	Set	.002	B T C.	1-5-3 6 2 4	.....	.....	.010	.013	.016	.028
" 421-J	104	2	4¾	.018*	B T C	Set	.002	B T C.	1 5 3 6 2 4	.....	.....	.010	.013	.016	.028
" 427-T	104	2	4¾	.021*	B T C.	Set	.004	A T C	1 4-7-3-8-5-2-6	.....	.....	.018	.018	.022	.028
LAFAYETTE 110.....	104	40	4¾	.038	B T C	Set	.....	.....	1-5 3 6 2 4	.....	.....	.012	.012	.020	.025
LA SALLE 350.....	104	40	4¾	.023	B T C	Set	T D C.	.....	1-6-2 5 8 3 7 4	.013	.015	.006	.009	.020	.026
LINCOLN	104	40	4½	.032	B T C	Adv	.169	B T C	1 4-9 8-5-2-11-10-3-6-7-12	.003	.005	.003	.005	.020	.022
MARMON 16.....	104	2	4	.013	B.T.C.	Adv.	.012	B T.C.	{ 1L-3R-6L-7R-2L-4R-5L- 1R-8L 6R-3L-2R-7L-5R- 4L-8R	.014	.014	.008	.008	.018	.022
NASH 1220.....	113*	37	4¾	.084	B T C.	Set	.....	.....	1 5-3 6 2-4	.....	.....	.015	.015	.020	.022
" 1280.....	113*	37	4½	.082	B.T.C.	Set	.....	.....	1-6-2 5 8-3-7-4	.....	.....	.015	.015	.020	.022
" 1290.....	113	31	4½	.086	B.T.C.	Set	.....	.....	1-6-2 5-8-3 7-4	.....	.....	.015	.015	.020	.022
OLDSMOBILE F-34.....	104	40	4¾	.004	B.T.C.	Set	T.D.C.	.....	1-5-3-6-2-4	.012	.012	.008	.010	.022	.025
" L-34.....	104	2	4¾	.005	B.T.C.	Set	T D C	.....	1-6-2 5 8-3-7-4	.012	.012	.010	.010	.022	.025
PACKARD 1100.....	114	5	5	.015	B.T.C.	Set	.364	B T C.	1-6-2 5 8 3-7-4	.0025	.004	.004	.006	.018	.025
" 1101.....	114	5	5	.015	B.T.C.	Set	.364	B T C.	1-6-2 5 8 3 7-4	.0025	.004	.004	.006	.018	.025
" 1102.....	114	5	5	.015	B.T.C.	Set	.364	B T.C.	1 6 2 5 8-3-7-4	.0025	.004	.004	.006	.018	.025
" 1103.....	114	5	5	.015	B.T.C.	Set	.364	B T C.	1-6-2 5 8-3 7-4	.0025	.004	.004	.006	.018	.025
" 1104.....	114	5	5	.015	B.T.C.	Set	.364	B T C.	1-6-2 5 8-3-7 4	.0025	.004	.004	.006	.018	.025
" 1105.....	114	5	5	.015	B.T.C.	Set	.364	B T C	1 6 2 5 8 3-7 4	.0025	.004	.004	.006	.018	.025
" 1107.....	114	2	4	.022	B T C	Set	.292	B T C.	{ 1R-6L-5R-2L-3R-4L- 6R-1L-2R-5L-4R-3L	.0025	.004	.004	.006	.018	.027
" 1108.....	114	2	4	.022	B.T.C.	Set	.292	B T.C.	{ 1R-6L-5R-2L-3R-4L- 6R-1L-2R-5L-4R-3L	.0025	.004	.004	.006	.018	.027
PIERCE-ARROW 836-A..	114	29	5	.010	B.T.C.	Adv.	.010	A T C	1-6-2 5-8 3 7 4	.007	.007	A	A	.018	.025
" 840-A..	114	29	5	.010	B.T.C.	Adv.	.010	A T C.	1-6-2 5 8 3 7-4	.007	.007	A	A	.018	.025
" 1240-A	114	42	4	.008	B.T.C.	Adv.	.005	B T.C.	1-4-9 8-5-2-11-10-3-6-7-12	.007	.007	A	A	.018	.028
PLYMOUTH PE (Aluminum Head).....	114-103	42-12	4¾	.014	A T C	Set	.014	A T C.	1 5-3-6-2-4	.011	.012	.005	.007	.020	.025
" PE (Cast Iron Head).....	114-103	42-12	4¾	.004	A T.C.	Set	.014	A T C.	1-5 3 6 2-4	.011	.012	.005	.007	.020	.025
" PF (Aluminum Head).....	114-103	42-12	4¾	.014	B.T.C.	Set	.014	A T C.	1-5 3 6 2 4	.011	.012	.005	.007	.020	.025
" PF (Cast Iron Head).....	114-103	42-12	4¾	.032	B.T.C.	Set	.014	A T C.	1 5-3-6-2-4	.011	.012	.005	.007	.020	.025
" PG (Aluminum Head).....	114-103	42-12	4¾	.014	B.T.C.	Set	.014	A.T.C.	1-5-3-6-2-4	.011	.012	.005	.007	.020	.025
" PG (Cast Iron Head).....	114-103	42-12	4¾	.032	B.T.C.	Set	.014	A.T.C.	1-5-3-6-2-4	.011	.012	.005	.007	.020	.025

1934 Valve and Ignition Timing Specifications (continued)

Compiled by Weidenhoff Engineers for use with
Weidenhoff Motor Gauge

1934 Passenger Cars	Adapter	Rod	Stroke	Ignition Timing	Before or After T.D.C.	Spark Retard, Advance or Set	Intake Valve Opens	Before or After T.D.C.	Firing Order	Valve Clearances				Breaker Contact Separation	Spark Plug Gap (Ins.)
										Timing		Running			
										Int.	Exh.	Int.	Exh.		
PONTIAC	114	42	3½	.004*	B.T.C.	Set	.025	B.T.C.	1-6-2-5-8-3-7-4	....	....	.009	.011	.018	.025
REO "Flying Cloud".....	104	2	5	.012	B.T.C.	Set	T.D.C.	.....	1-5-3-6-2-4	.012	.012	.007	.007	.025	.025
" 8	104	2	5	.014	B.T.C.	Set	T.D.C.	.....	1-6-2-5-8-3-7-4	.012	.012	.008	.008	.020	.025
STUDEBAKER "A" Dict..	104	2	4½	T.D.C.*	.....	*	.082	B.T.C.	1-5-3-6-2-4	.010	.010	.004	.006	.020	.025
" "D" Dict..	104	2	4½	T.D.C.*	.....	Set	.082	B.T.C.	1-5-3-6-2-4	.010	.010	.004	.006	.020	.025
" "B" Comm.	104	2	3¾	T.D.C.*	.....	Adv.	.074	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.004	.006	.020	.025
" "C" Pres..	104	2	4¾	T.D.C.*	.....	*	.082	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.004	.006	.020	.025
STUTZ SV-16	113	31	4½	.086	B.T.C.	Adv.	.001	B.T.C.	1-6-2-5-8-3-7-4	.028	.028	.028	.028	.017	.025
" DV-32	104	8	4½	.152	B.T.C.	Adv.	.009	B.T.C.	1-6-2-5-8-3-7-4	.046	.046	.046	.046	.020	.022
TERRAPLANE 6	114	43	5	T.D.C.	.....	Set	.045	B.T.C.	1-5-3-6-2-4	.010	.010	.006	.008	.013	.023
WILLYS 77	104	2	4¾	.006	B.T.C.	Set	T.D.C.	.....	1-3-4-2	.010	.010	.004	.006	.018	.025

EXPLANATION OF ABBREVIATIONS

Adv.—Advanced Spark

B.T.C.—Before Top Center

H—Hot

T.D.C.—Top Dead Center

A—Automatic Take-up

A.T.C.—After Top Center

C—Cold

Ret.—Retarded Spark

*Buick—Models 40 and 50 only have two given settings—above timing for straight run fuel—.019 for high compression fuel.

*Chevrolet-Master—Use No. 113 Adapter with No. 152 Adapter.

*Franklin—No. 120 Plate to be used with No. 113 Adapter. Place plate on top of No. 113 Adapter—this is to keep rod from sliding thru.

*Hudson and Hupmobile cars must be timed from rear cylinder.

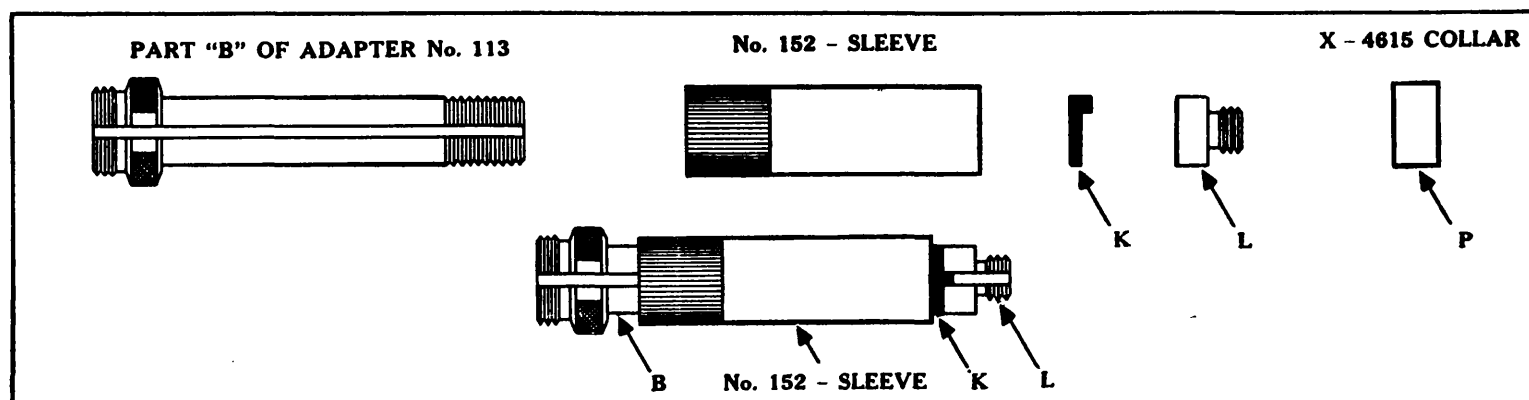
*Nash—1220 and 1280 use No. 113 Adapter with No. 152 Adapter plus No. X-4615 Collar.

*Pontiac has two given settings—above timing for straight run fuel—.025 for high compression fuel.

*Studebaker—Ignition timing to be set with engine at rest and no pin in spark modifier.

**Champion No. 8 plugs are standard equipment. Champion No. C-7 plugs are optional hotter-running plugs. Champion No. 13 plugs are optional colder running plugs.

NOTE—Cars using 14 mm. spark plugs, first insert rod through spark plug hole and slip adapter over rod.



INSTRUCTIONS FOR USE OF SPECIAL ADAPTER No. 152 ON 1934 CHEVROLET AND NASH 1220 AND 1280 AUTOMOBILES USING 14-MM SPARK PLUGS

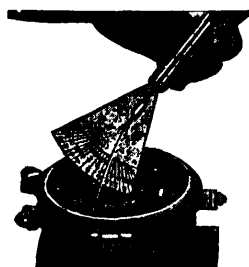
Screw No. 152 sleeve onto Part "B" as far as it will go. Slide Part "K" against No. 152 sleeve. Screw Part "L" on as far as it will go, then back off until slots line up. Slide Part "K" against "L" and then lock entire assembly with No. 152 sleeve. When used on Nash model 1220 or 1280 engines slide Part "P" over Part "L".

Specialized Electrical Service Station Tools

CONTACT SPRING TENSION SCALES

This year we are able to offer you a choice in Brush Arm and Contact Spring Tension Scales. Both scales were designed expressly for electrical Service Station use, and carry special graduations to meet automotive electrical requirements.

The new 1934, eight lobe, single breaker arm distributors are very sensitive to variations in contact spring tension, and they should be adjusted to the exact tension specified for the particular unit being serviced. Brush spring tensions have been greatly increased, particularly in starting motors and it is equally important that correct brush spring tension be maintained, especially during cold weather when maximum demands are made upon both starting motors and generators.



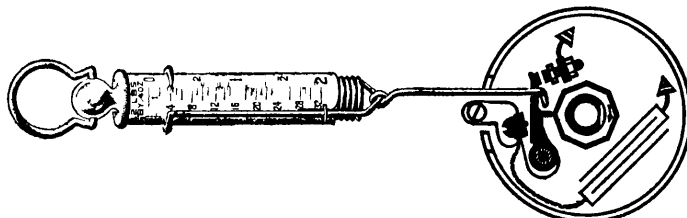
FAN TYPE SCALE

This instrument was developed in the laboratories of one of the large equipment manufacturers, and employs an entirely new principle in making spring tension tests. The dial is graduated in divisions of 4 oz., and has a maximum capacity of 3 lbs. A special attachment is supplied for making brush spring tension tests.

Price each \$2.00

"MIDGET" POCKET SCALE

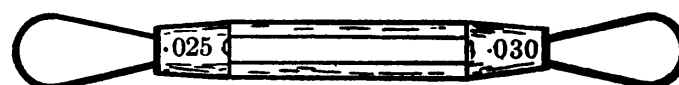
Capacity 2 pounds, graduated in $\frac{1}{4}$ ounces. Made of brass, beautifully nickelplated. Very sensitive and accurate



For testing contact arm spring tension on distributors and brush tension on both starting motors and generators. These scales are built to Standard Engineering specifications by one of the large spring scale manufacturers.

Price each \$2.25

GAP GAUGES

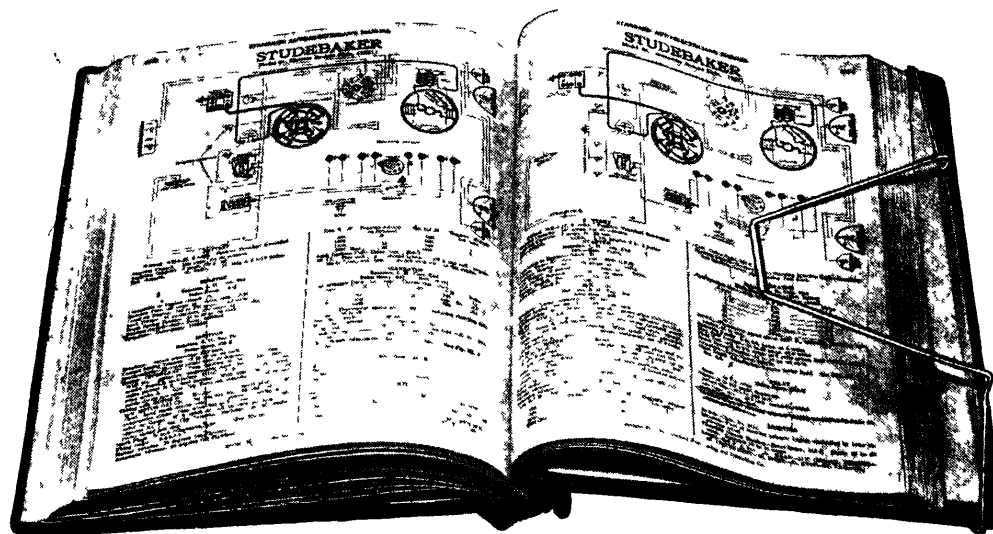


A new round wire gauge, designed especially for checking AC type S-9 and SL-9 Spark Plugs with fixed gaps. These plugs are standard equipment on the 1934 Chrysler, DeSoto, Dodge, and Plymouth automobiles.

Gap gauge sizes .025 and .030 inch.

Price each \$0.50

"EAGLE GRIP" PAGE HOLDER



This novel device now makes it possible for a mechanic to use both hands while doing generator, distributor, or other bench tests, as the Wiring Manual is held flat open to any given page. With this holder your Manual can be used out of doors, while making electrical check-ups on cars, without fear of the wind turning the pages.

Price of Holder \$0.60

SPECIAL OFFER!

Complete set of new covers, with choice of either a wide or narrow back flap, and a full set of long or short binding screws (for a ten year or a five year Manual), and a new "Eagle Grip" Holder at a price of only.....\$1.75.

Shipping Weight, 2 lbs.

TRUCENTER ARMATURE TUNING KIT (Pat nted)

IMPORTANT!

To take care of the new Delco-Remy Starting Motor Armatures with a half inch drive end shaft a .500 bushing has been substituted for the now obsolete .472 bushing formerly included.

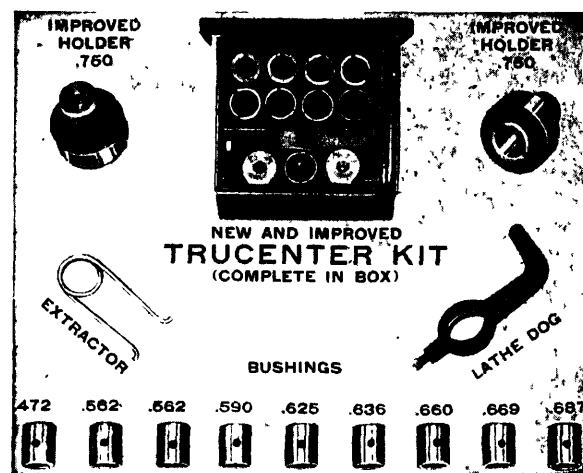


Fig. 1

The NEW AND IMPROVED Trucenter Tool Kit is sold complete as shown in Figure 1. It consists of two improved, round type holders or chucks, nine accurately ground bushings, a bushing extractor, and a malleable iron lathe dog, all packed in an attractive, as well as a substantial, metal box. The improved holders are designed to allow ample clearance for the lathe tool or undercutting saw, and in addition they are much safer for the lathe operator as, now, there are no sharp, revolving corners to be avoided. The Trucenter outfit is unconditionally guaranteed by the manufacturers to within an accuracy of .0015 of an inch, and to be free from all defects in material and workmanship. The assortment of nine bushings, with correct inside diameters to fit all conventional armatures, in conjunction with the two 750 thousandths holders, makes the instrument absolutely universal. Intermediate size bushings will be made on order to meet the special requirements of repair shops doing a general line of commercial motor work. While the TRUCENTER KIT was originally developed for use on centerless armatures only, this precision tool has since proven so practical that many repair shops now use it on all armatures, to insure positive turning accuracy when working with old, damaged, or battered shafts.

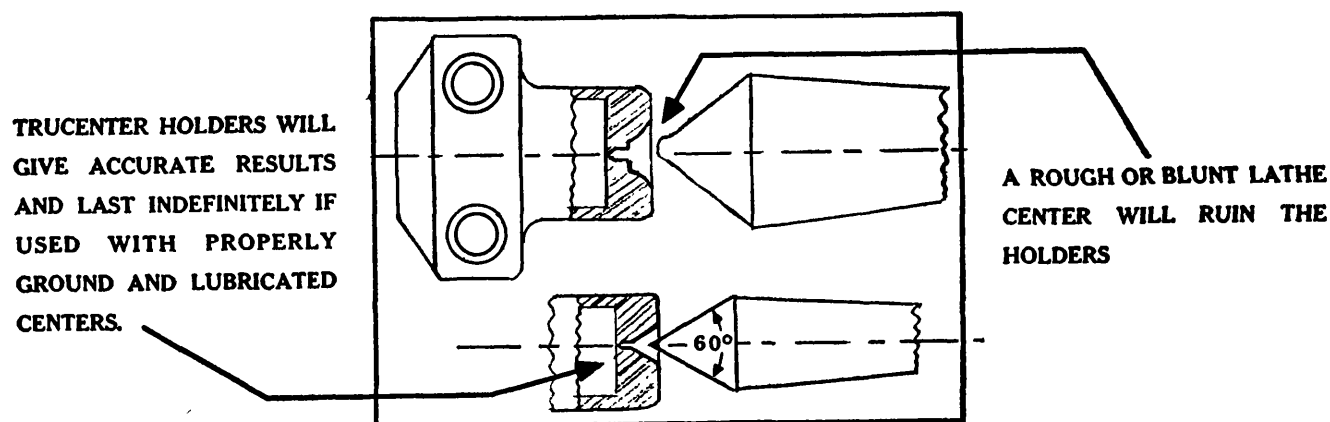
Price Complete, as shown.....\$9.75

Shipping Weight, 3 lbs.

Special Bushings made to order Price each \$0.80

LATHE CENTER GRINDING SERVICE

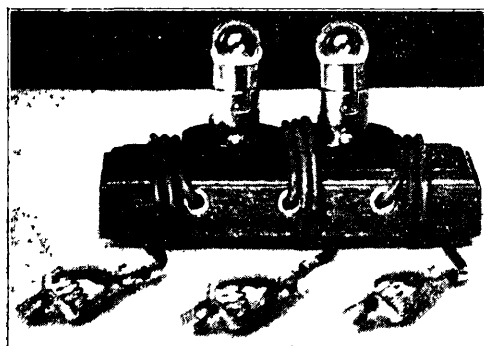
If your lathe centers are not in perfect condition, but are blunt, rough, "burned", or in an otherwise damaged condition, you not only will find it impossible to do accurate turning on your lathe but if you undertake to run a new Trucenter Kit between them you will ruin the holders the first time they are used.



Fully realizing that but few Electrical Service Stations have facilities for accurately grinding lathe centers, we take pleasure in offering a one-day grinding service which will interest you. Arrangements have been made with a local high class grinding establishment to render prompt service on lathe centers. This means that if we receive your lathe centers in the morning's mail they will be ground and returned to you the same day.

In establishing a price of only \$1.00 a set for this unique grinding service, we completely disregarded the idea of making a profit, but are solely interested in helping you to better your service facilities by putting your equipment in a usable condition.

Center Grinding (per pair) \$1.00



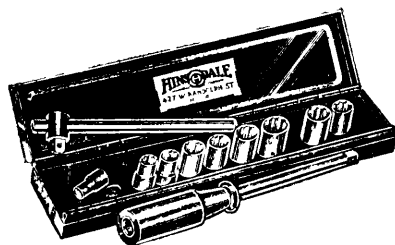
TWIN TEST AND SYNCHRONIZING LIGHTS

The two single contact 6 volt lights are held in substantial, bayonet type sockets, mounted on a two by five inch polished wood base. The three flexible test leads are each 24 inches in length, which permit of a span of 48 inches, when using the equipment for circuit testing. Ideal for use with synchronizers, breaker gauges, etc., which are sold without lights.

Price complete with lights \$2.00

Shipping Weight, 1 lb.

HINSDALE NO. 11-M MIDGET SOCKET SET



Mechanics will appreciate this attractive new set of genuine chrome vanadium 12 point sockets. It has thousands of uses, in the shop and laboratory. For carburetor, ignition, etc., on automobile and airplane, electrical devices, oil burners, refrigerators, scientific apparatus, radios, models and machinery of all kinds, from typewriters to printing presses - any place that millions of small bolts and nuts are used.

The special enameled metal box is a permanent container with a place for each socket. The two handles make it easy to reach nuts every place. All parts are finished in polished chromium plate. All sockets 12 point and 8 point. Openings as follows: Hex 7/32, 1/4, 9/32, 5/16, 11/32, 3/8, 5/16. Square - 1/4, 5/16, 4 1/2" Slide T Handle and 6" Forged Extension Bar with Hard Rubber Screwdriver type handle. Enameled Metal Box size 1 x 1 1/8 x 8"

Price Complete, as shown \$2.95

Shipping weight, 2 lbs.

HINSDALE NO. 6-M UTILITY IGNITION KIT

For Radio and Ignition Work



Auto-electricians and mechanics will find a thousand uses for this utility ignition kit. The four chromium plated End Wrenches covering eight sizes, openings from 7/32" to 3/8" fit all standard ignition electrical and small apparatus bolts and nuts. The chrome vanadium steel adjustable pliers have a thousand and one uses. A special locking joint makes them adjustable in three positions. The small screw driver has an alloy steel blade, and an unbreakable shock

proof handle. Each set is packed in a neat cardboard case. The tools are finished in triple chromium plate

Openings of End Wrenches as follows:

No. EI 6 1/2-7	13/64 x 7/32	No. EI 7 1/2-8	15/64 x 1/4
No. EI 9-10	9/32 x 5/16	No. EI 11-12	11/32 x 3/8

Pliers PI 4 1/2 4 1/2" long

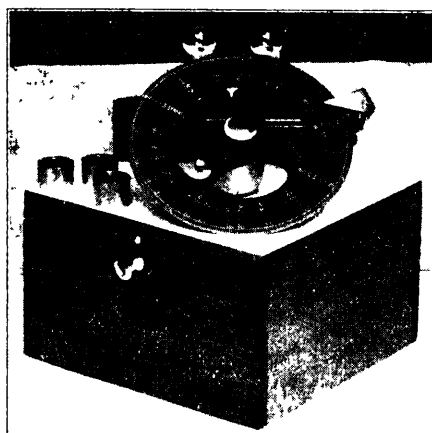
Screwdriver K 182 R 4" long

Price Complete, as shown \$2.35

Shipping Weight, 1/2 lb.

THE JAYNES SYNCHRONIZER

Designed to meet the demand for a popular priced, accurate Universal Synchronizer with graduated dial and test lights.



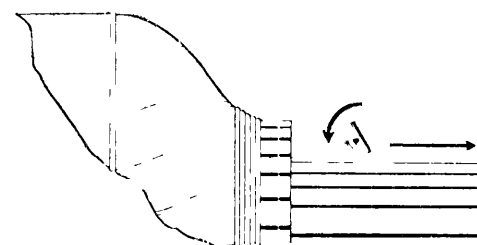
The four and one half inch rotating dial is accurately divided into three hundred and sixty degrees. The firing positions for many multi-cylinder automobile engines are distinctly marked to assure ease of operation. The indicator pointer is adjustable, and is attached to the edge of the distributor cup. The twin test lights are mounted separately on an attractively finished wooden base.

Shipped complete with twin test lights, bushings to fit all distributors, and packed in a substantial mahogany box, with hinged cover and clasp fastener (synchronizing instructions included).

Price each \$8.00 Shipping Weight, 3 lbs.

MICA MILLING CUTTERS

(Hullhorst)



Will fit Burton & Rogers, Allen Wendenhoff Hullhorst, and many other power undercutters. Diameter of cutters 1/4 inch. Made in five thicknesses: .015", .020", .025", .030", .035".

Price each \$0.25

JACOBS "CENTER REST" CHUCK FOR TURNING CENTERLESS ARMATURES

NOTE: This description is of interest only to Service Station Operators who are using a regular screw cutting engine lathe which, of course, will permit of the mounting of a Universal Chuck on the head stock, and the removal of the center from the tail stock



Fig. 1



Fig. 2



Fig. 3

Figure 1 shows the new Jacobs "Center Rest" Chuck, which is mounted in the tail stock of a lathe, and permits the turning of round work (centerless armatures with a diameter of from $\frac{1}{4}$ inch to $\frac{3}{4}$ inch), without the use of a center. As a matter of fact, even where the armature is provided with a center hole, this is often damaged, and better results will be secured by chucking the shaft. The stationary bronze jaws provide a bearing for the work which is to be turned, and these jaws are adjusted for the diameter of the armature shaft, and locked in place. Actually the chuck replaces the conventional lathe bed Steady Rest. The chuck is easier and more convenient to use, and has equal accuracy.

Figure 2 shows the solid taper arbor for attaching the chuck to the tail stock. Arbors are made with various tapers to fit all makes and model lathes, however, our engineers have found that Morse No. 2 and No. 3 tapers are the most common ones used. For your convenience in ordering we are printing a template of the Morse tapers (see Fig. 4).

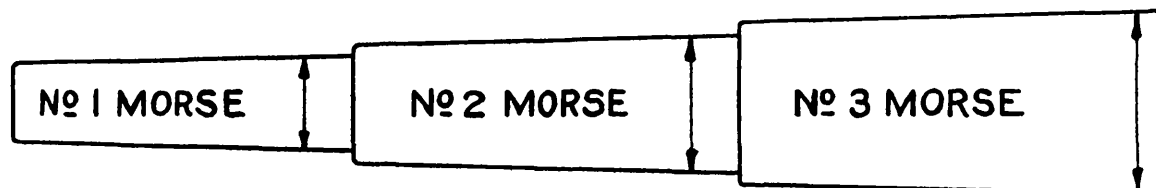


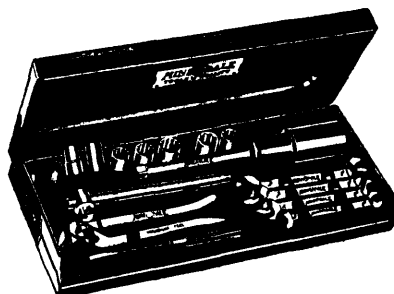
Fig. 4

Take a pair of sharp scissors, and cut along the line. Remove your tail stock center and try the paper template in the hole. From the depth it goes in you can determine the taper number. If your taper hole does not conform to any of the three dimensions shown, supply us with an accurate measurement of the diameter of the hole at the large end, and the approximate length of the center, and our engineers will gladly figure out your requirements, advising you as to the slight extra cost, if any, for a special arbor.

Price of Jacobs "Center Rest" Chuck, capacity $\frac{1}{4}$ inch to $\frac{3}{4}$ inch, with solid arbor, either Morse No. 1, No. 2, or No. 3 Tapers \$11.25

Shipping Weight, 4 lbs.

HINSDALE NO. 17-M COMPLETE IGNITION KIT



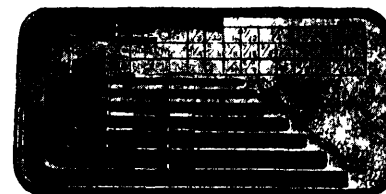
The seventeen tools contained in this kit comprise a complete assortment for all kinds of small work, making the set a great favorite with service mechanics on radios, oil burners, ignition, electrical devices, household devices, instruments and apparatus of all kinds.

The set contains all the socket tools and handle contained in Set No. 11-M, and the end wrenches, pliers and screwdrivers in Set No. 6-M. All tools are finest heat treated chrome vanadium steel, full chromium plated and polished. Packed in a special enameled metal carrying case.

Price Complete, as shown \$5.85

Shipping Weight, 3 lbs

HOLLOW SET SCREW WRENCH SET



A complete set of ten offset wrenches, sizes (measured across flats) $\frac{5}{64}$, $\frac{3}{32}$, $\frac{1}{8}$, $\frac{5}{32}$, $\frac{3}{16}$, $\frac{7}{32}$, $\frac{1}{4}$, $\frac{9}{32}$, $\frac{5}{16}$ and $\frac{3}{8}$ inches, supplied in a substantial steel box, on which is plainly stamped a reference chart for determining the correct wrench for the various size screws.

Windshield wiper, carburetor, and electrical equipment manufacturers are each year using hollow set screws for more and more purposes, and no up-to-date shop can afford to be without a set of proper wrenches to service this new equipment.

Price Complete, as shown \$2.00

Shipping Weight, 2 lbs

1934 Supplement

SYSTEM INDEX

AUTO-LITE

Generator, Model GAM-46011324
 Generator, Model GAR-46011308
 Generator, Model GAR-46031278
 Generator, Model GAR-46061304
 Generator, Model GAS-4104-B1282
 Generator, Model GBK-46021301
 Generator, Model GBK-46031302

Starter, Model MAB-40521329
 Starter, Model MAB-40531308
 Starter, Model MAB-40541309
 Starter, Model MAB-40551310
 Starter, Model MAB-40601330
 Starter, Model MAB-40611301
 Starter, Model MAB-40621305
 Starter, Model MAB-40631280
 Starter, Model MAB-40651302
 Starter, Model MAJ-40321278
 Starter, Model MAJ-40331279
 Starter, Model MAN-40021324
 Starter, Model MAN-40051325
 Starter, Model MZ-40351294

DELCO (Delco-Remy after Jan. 1, 1927)

Starter, Model 5801288

DYNETO

Generator, Type CO-11661315
 Generator, Type CO-11771313
 Starter, Type DI-11611313
 Starter, Type DN-11621315
 Starter, Type DN-11631314

REMY (Delco-Remy after Jan. 1, 1927)

Generator, Model 929-A1316
 Generator, Model 933-B1287
 Generator, Model 933-C1288
 Generator, Model 935-B1290
 Generator, Model 935-C1321
 Generator, Model 935-D1292
 Generator, Model 935-E1298
 Generator, Model 935-F1311
 Generator, Model 935-G1293
 Generator, Model 935-K1283

Generator, Model 935-M1312
 Generator, Model 937-G1319
 Generator, Model 937-P1296
 Generator, Model 956-H1284
 Generator, Model 961-C1306
 Generator, Model 967-L1300
 Generator, Model 967-M1299

Starter, Model 727-F1285
 Starter, Model 727-G1284
 Starter, Model 727-H1312
 Starter, Model 727-J1293
 Starter, Model 727-L1295
 Starter, Model 727-M1292
 Starter, Model 727-N1306
 Starter, Model 728-U1287
 Starter, Model 734-S1290
 Starter, Model 734-U1299
 Starter, Model 734-W1321
 Starter, Model 734-Z1283
 Starter, Model 736-G1323
 Starter, Model 736-H1326
 Starter, Model 738-B1322
 Starter, Model 738-D1298

1934 CAR INDEX

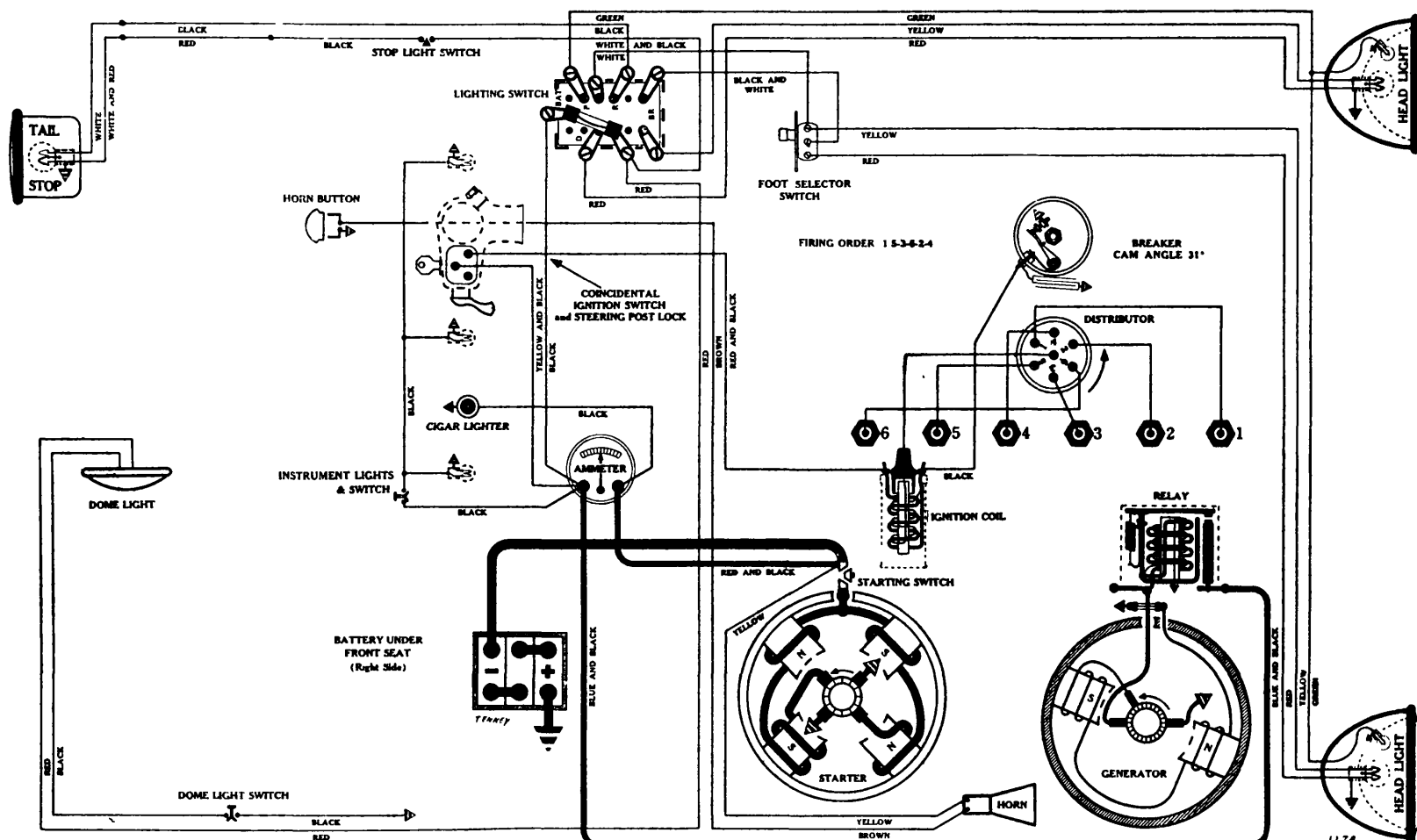
Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
AUBURN							
1278		1934	6-52-X 6 cyl.		Auto-Lite MAJ-4032	Auto-Lite GAR-4603	Auto-Lite IGB-4318
1279		1934	6-52-Y 6 cyl.		Auto-Lite MAJ-4033	Auto-Lite GAR-4603	Auto-Lite IGB-4318
1280		1934	8-50-X Straight Eight		Auto-Lite MAB-4063	Auto-Lite GAR-4603	Auto-Lite IGP-4002-A
1281		1934	8-50-Y Straight Eight		Auto-Lite MAB-4063	Auto-Lite GAR-4603	Auto-Lite IGP-4002
See 1933 diagram		1934	12-50 "Vee" 12		Delco-Remy 543	Delco-Remy 931-F	Delco-Remy 667-Z
AUSTIN							
1282		1934	4 cyl.		Auto-Lite MAK-4001	Auto-Lite GAS-4104-B	Auto-Lite IGB-4086-A
BUICK							
1283		1934	34-40 Light St. Eight		Delco-Remy 734-Z	Delco-Remy 935-K	Delco-Remy 663-E
1284		1934	34-50 Small St. Eight		Delco-Remy 727-G	Delco-Remy 956-H	Delco-Remy 663-C
1285		1934	34-60 and 34-90 Big St. Eights		Delco-Remy 727-F	Delco-Remy 956-H	Delco-Remy 663-A
CADILLAC							
1286		1933	355-C, "Vee" 8 (Late)		Delco-Remy 728-P	Delco-Remy 927-S	Delco-Remy 661-P
1287		1934	355-D "Vee" 8		Delco-Remy 728-U	Delco-Remy 933-B	Delco-Remy 661-V
1288		1934	370-D "Vee" 12		Delco-Remy 580	Delco-Remy 933-C	Delco-Remy 667-C
1289		1934	452-D "Vee" 16		Delco-Remy 580	Delco-Remy 933-C	Delco-Remy 4118
CHEVROLET							
1290		1934	Master Series DA, 6 cyl.		Delco-Remy 734-S	Delco-Remy 935-B	Delco-Remy 644-R
1291		1934	Standard Series DC, 6 cyl.		Delco-Remy 714-L	Delco-Remy 943-J	Delco-Remy 622-L
CHRYSLER							
1292		1934	CA and CB Standard, 6 cyl.		Delco-Remy 727-M	Delco-Remy 935-D	Delco-Remy 644-U
1293		1934	CU and CV— "Airflow" Straight Eights		Delco-Remy 727-J	Delco-Remy 935-G	Delco-Remy 661-S, 661-T
CONTINENTAL							
1294		1934	41, "Beacon" 4 cyl.		Auto-Lite MZ-4035	Auto-Lite GAM-4505	Auto-Lite IGB-4202-A
DE SOTO							
1295		1934	SE—"Airflow" 6 cyl.		Delco-Remy 727-L	Delco-Remy 935-D	Delco-Remy 644-U
DODGE							
1296		1934	DR and DS 6 cyl.		Delco-Remy 734-H	Delco-Remy 937-P	Delco-Remy 644-U
FORD							
1297		1934	40 "Vee" 8		Ford 40-11002	Ford Air-Cooled 40-10000-B	Ford-Mallory 40-12000-B
FRANKLIN							
See 1933 diagram		1934	Olympic Series 18-C, 6 cyl.		Delco-Remy 723-C	Delco-Remy 957-E	Delco-Remy 644-E
See 1933 diagram		1934	Series 19-B		Delco-Remy 723-C	Delco-Remy 957-E	Delco-Remy 644-E
See 1933 diagram		1934	Series 17-B "Vee" 12		Delco-Remy 545	Delco-Remy 931-G	Delco-Remy 667-A
GRAHAM							
1298		1934	68, Standard and DeLuxe, 6 cyl.		Delco-Remy 738-D	Delco-Remy 935-E	Delco-Remy 632-Z
1299		1934	67, Standard and DeLuxe Straight Eights		Delco-Remy 734-U	Delco-Remy 967-M	Delco-Remy 661-X
1300		1934	69, "Super-Charged" Straight Eight		Delco-Remy 734-U	Delco-Remy 967-L	Delco-Remy 661-Y
HUDSON							
1301		1934	LL, LT, LLU & LW Straight Eights		Auto-Lite MAB-4061	Auto-Lite GBK-4602	Auto-Lite IGP-4001-A
HUPMOBILE							
1302		1934	W, Series 417 6 cyl.		Auto-Lite MAB-4065	Auto-Lite GBK-4603	Auto-Lite IGB-4319
1303		1934	J, Series 421 6 cyl.		Auto-Lite MAB-4065	Auto-Lite GBK-4603	Auto-Lite IGC-4058
1304		1934	T, Series 427 Straight Eight		Auto-Lite MAB-4066	Auto-Lite GAR-4606	Auto-Lite IGP-4003

CAR INDEX (continued)

Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
1305	LAFAYETTE	1934	110 6 cyl.		Auto-Lite MAB-4062	Auto-Lite GAR-4205	Auto-Lite IGB-4317
1306	LA SALLE	1934	350 Series 50		Delco-Remy 727-N	Delco-Remy 961-C	Delco-Remy 662-P
1307	LINCOLN	1934	Series 136 and 145 "Vee" 12		Auto-Lite MAO-4005	Auto-Lite GBC-4001	Auto-Lite IGM-4002
1308	NASH	1934	1220 Twin Ignition Big Six		Auto-Lite MAB-4053	Auto-Lite GAR-4601	Auto-Lite IGE-4012
1309		1934	1280 Twin Ignition Advanced St. Eight		Auto-Lite MAB-4054	Auto-Lite GAR-4601	Auto-Lite IGK-4101
1310		1934	1290 Twin Ignition Ambassador St. Eight		Auto-Lite MAB-4055	Auto-Lite GAR-4601	Auto-Lite IGK-4005
1311	OLDSMOBILE	1934	F-34 6 cyl.		Delco-Remy 734-K	Delco-Remy 935-F	Delco-Remy 622-S
1312		1934	L-34 Straight Eight		Delco-Remy 727-H	Delco-Remy 935-F or 935-M	Delco-Remy 662-N
1313	PACKARD	1934	1100, 1101 and 1102 Standard St. Eights		Owen-Dyneto DI-1161	Owen-Dyneto CO-1177	North East 5033450
1314		1934	1103, 1104 and 1105 Super St. Eights		Owen-Dyneto DN-1163	Owen-Dyneto CO-1177	North East 5033450
1315		1934	1107 and 1108 "Vee" 12		Owen-Dyneto DN-1162	Owen-Dyneto CO-1166	Auto-Lite IGO-4001
1316	PIERCE-ARROW	1934	836-A Straight Eight		Delco-Remy 497	Delco-Remy 929-A	Delco-Remy 662-J
1317		1934	840-A Straight Eight		Delco-Remy 497	Delco-Remy 927-V	Delco-Remy 662-J
1318		1934	1240-A and 1248-A "Vee" 12		Delco-Remy 498	Delco-Remy 927-V	Delco-Remy 4105
1319	PLYMOUTH	1934	PF and PG "Standard" 6 cyl.		Delco-Remy 734-H	Delco-Remy 937-G	Delco-Remy 622-U
1320		1934	PE, "De Luxe" 6 cyl.		Delco-Remy 734-H	Delco-Remy 937-P	Delco-Remy 644-K
1321	PONTIAC	1934	603 (Early) Straight Eight		Delco-Remy 734-W	Delco-Remy 935-C	Delco-Remy 663-B
1322		1934	603 (Late) Straight Eight		Delco-Remy 738-B	Delco-Remy 935-C	Delco-Remy 663-B
1323	REO	1934	Flying Cloud 6 cyl.		Delco-Remy 736-G	Delco-Remy 955-R	Delco-Remy 644-M
See 1933 diagram		1934	30 and 35-N, Royale Straight Eight		Delco-Remy 728-M	Delco-Remy 955-G	Delco-Remy 660-K
1324	STUDEBAKER	1934	"A", Dictator 6 cyl.		Auto-Lite MAN-4002	Auto-Lite GAM-4601	Auto-Lite IGB-4393
1325		1934	"D", Dictator 6 cyl.		Auto-Lite MAN-4005	Auto-Lite GAM-4601	Auto-Lite IGB-4393
1326		1934	"B", Commander Straight Eight		Delco-Remy 736-H	Delco-Remy 955-C	Delco-Remy 662-M
1327		1934	"C", President Straight Eight		Delco-Remy 736-H	Delco-Remy 955-C	Delco-Remy 662-M
1328	TERRAPLANE	1933	KU, DeLuxe, 6 cyl. (Late '33)		Auto-Lite MAJ-4031	Auto-Lite GBK-4602	Auto-Lite IGB-4074-A
1329		1933	KT, DeLuxe, St. Eight (Late '33)		Auto-Lite MAB-4052	Auto-Lite GBK-4602	Auto-Lite IGH-4024-A
1330		1934	K and KU 6 cyl.		Auto-Lite MAB-4060	Auto-Lite GBK-4602	Auto-Lite IGB-4301-A
1331		1934	Challenger 6 cyl. (Late)		Auto-Lite MAB-4060	Auto-Lite GAM-4503	Auto-Lite IGB-4301-A
1332	WILLYS	1934	77 4 cyl.		Auto-Lite MZ-4033	Auto-Lite GAM-4504	Auto-Lite IGB-4078

AUBURN

Model 6-52-X, 6 cyl., (1934)



BATTERY

U.S.L., RN-15-A, 6 volts. Positive Terminal Grounded
Starting Capacity—115 amps. for 20 minutes.
Lighting Capacity—4½ amps. for 20 hours (90 amp. hour).
Box—Length, 9; width, 7¼; height, 8½ inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAJ-4032

Connection to Engine—Bendix Drive, Type R11FX-10.
Running Free—67 amps. at 5½ volts, 4100 R.P.M.
Cranking Engine—225 to 250 amps. at 4.2 volts.
Lock Torque—12 pound-feet, 550 amps. at 3 volts.
Brush Spring Tension—44 to 56 oz. on each (new brushes).
Starting Switch—Auto-Lite, SW-3737-S (on starter).
Armature—Auto-Lite, MAJ-2006.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGB-4318

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 31 degrees; open 29 degrees.
Contact Spring Tension—17 to 19 oz.
Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when 3 degrees, or approximately one tooth before flywheel reaches T.D.C. mark. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .004 inch before T.D.C., as indicated on Gauge.

Spark Plugs—14-MM (Champion type J-7); Gap .025 inch.
Firing Order—1-5-3-6-2-4.

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
600	300		3
1320	660		5
1800	900		7
2280	1140		10
3000 (Max.)	1500		

Ignition Coil—Auto-Lite, IG-4065.
Ignition Switch—Oakes Steering Post and Ignition Lock.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAR-4603 (Belt Drive, Air Cooled)

Performance Data—Gen. Cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.2	10	1150	7.1
2	850	6.3	14	1400	7.6
4	900	6.5	16	1600	7.8
6	950	6.7	18	1800 (Max.)	8.
8	1050	7.			

Motoring Freely—5.2 amps. at 6 volts.
Max. Stall Current—24 to 26 amps. at 5½ volts.
Field Test—4.1 amps. at 6 volts across field coils in series.
Field Fuse—7½ amps. (Type 1A-7½).
Brush Spring Tension—24 to 36 oz. on each (new brushes).
Armature—Auto-Lite, GAR-2077.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

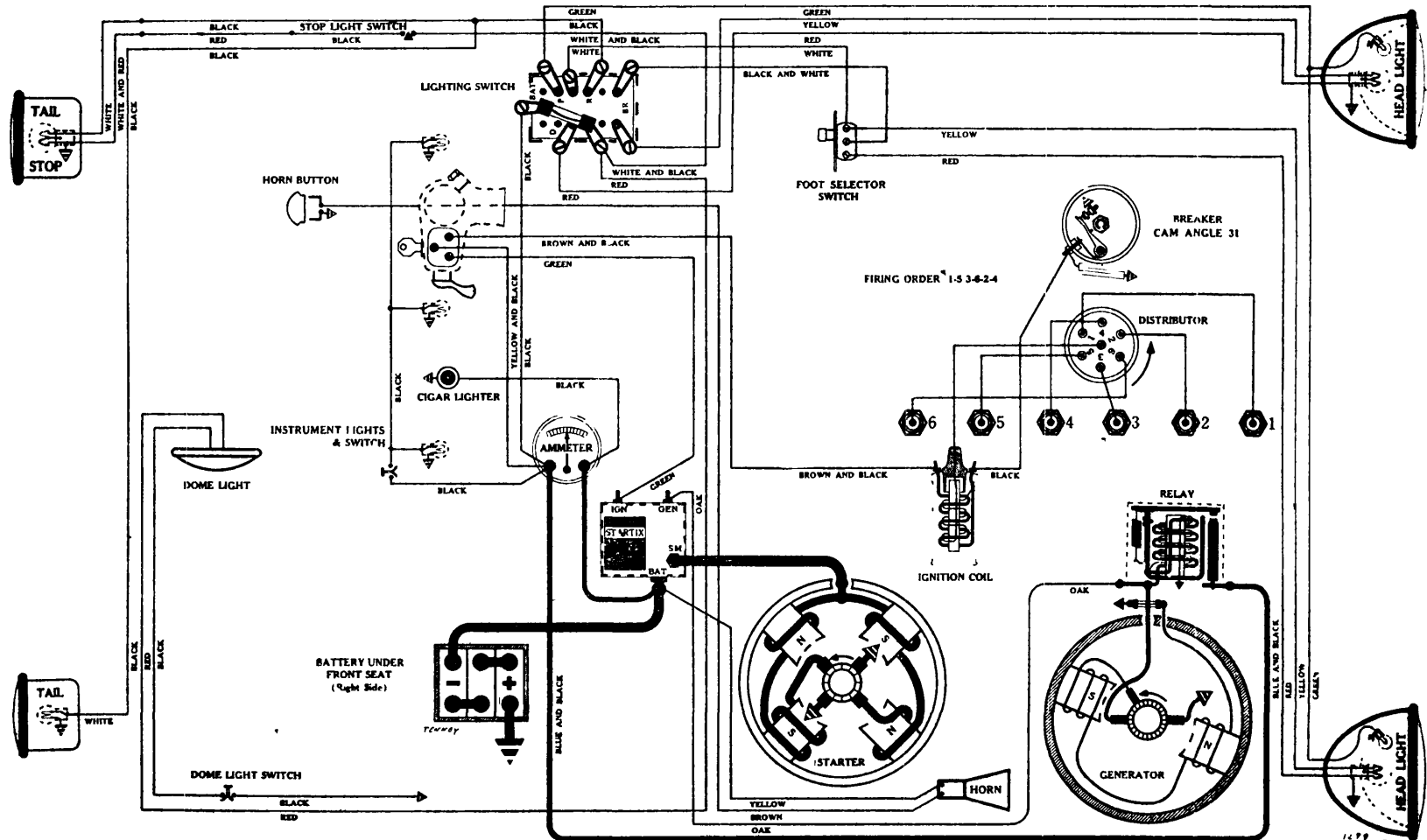
Closes—6¼ to 7½ volts.
Opens—½ to 2½ amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .020 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. B-5640-A.
Location—Behind instrument board, operated by pull knob.
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.
Spare fuse in clip on switch support.
Foot Selector Switch—Delco-Remy, 465-W.
Lamps—See Lamp Table, Sec. AA. HEAD—1116; PARK—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

AUBURN

Model 6-52-Y, 6 cyl., (1934)



BATTERY

U.S.L., RN-15-A, 6 volts. Positive Terminal Grounded
 Starting Capacity—115 amps. for 20 minutes.
 Lighting Capacity—4½ amps. for 20 hours (90 amp. hour).
 Box—Length, 9; width, 7½; height, 8½ inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAJ-4033

Connection to Engine—Bendix Drive, Type R11FX-10.
 Running Free—67 amps. at 5½ volts, 4100 R.P.M.
 Cranking Engine—225 to 250 amps. at 4.2 volts.
 Lock Torque—12 pound-feet, 550 amps. at 3 volts.
 Brush Spring Tension—44 to 56 oz. on each (new brushes).
 Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.
 Armature—Auto-Lite, MAJ-2006.

IGNITION

Rotation, L. H., Top View
 Auto-Lite, IGB-4318
 (Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
 Cam Angles—Points closed 31 degrees; open 29 degrees.
 Contact Spring Tension—17 to 19 oz.
 Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when 3 degrees, or approximately one tooth before flywheel reaches T.D.C. mark. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
 Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .004 inch before T.D.C., as indicated on Gauge.
 Spark Plugs—14-MM (Champion type J-7); Gap .025 inch.
 Firing Order—1-5-3-6-2-4.
 Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
1320	660	3
1800	900	5
2280	1140	7
3000 (Max.)	1500	10

Ignition Coil—Auto-Lite, IG-4065.

Ignition Switch—Oakes Steering Post and Ignition Lock.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAR-4603 (Belt Drive, Air Cooled)

Performance Data—Gen. Cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.2	10	1150	7.1
2	850	6.3	14	1400	7.6
4	900	6.5	16	1600	7.8
6	950	6.7	18	1800 (Max.)	8.
8	1050	7.			

Motoring Freely—5.2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5½ volts.

Field Test—4.1 amps. at 6 volts across field coils in series.

Field Fuse—7½ amps. (Type 1A-7½).

Brush Spring Tension—24 to 36 oz. on each (new brushes).

Armature—Auto-Lite, GAR-2077.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

Closes—6¾ to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .020 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. B-5640-A.

Location—Behind instrument board, operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.

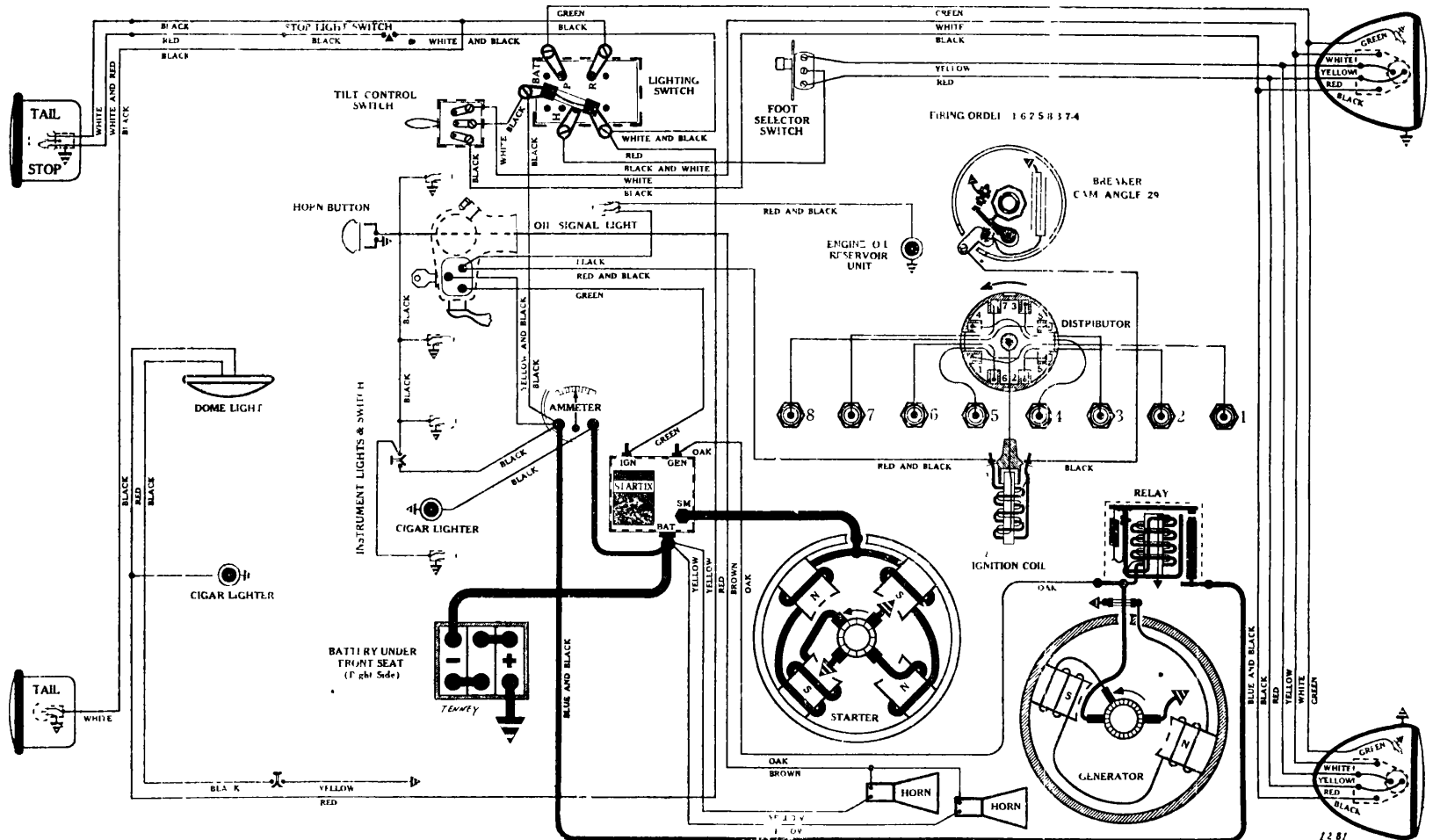
Spare fuse in clip on switch support.

Foot Selector Switch—Delco-Remy, 465-W.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; PARK—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158 (Left Fender); TAIL—63; (Right Fender).

AUBURN

Model 8-50-Y, Straight Eight, (1934)



BATTERY

U.S.L., XY-15-A, 6 volts. Positive Terminal Grounded
 Starting Capacity—122 amps. for 20 minutes.
 Lighting Capacity—5¼ amps. for 20 hours (105 amp. hour).
 Box—Length, 10¼; width, 7¼; height, 8½ inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAB-4063

Connection to Engine—Bendix Drive, Type R11FX-10.
 Running Free—60 amps. at 5½ volts, 3700 R.P.M.
 Cranking Engine—275 to 300 amps. at 4.3 volts.
 Lock Torque—15½ pound-feet, 582 amps. at 3 volts.
 Brush Spring Tension—44 to 56 oz. on each (new brushes).
 Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.
 Armature—Auto-Lite, MAB-2006.

IGNITION

Rotation, L. H., Top View
 Auto-Lite, IGP-4002

(Full Automatic Spark Advance)

Breaker—Contact separation .015 inch.
 Cam Angles—Points closed 29 degrees; open 16 degrees.
 Contact Spring Tension—17 to 21 oz.
 Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when 3 degrees, or approximately one tooth before flywheel reaches T.D.C. mark. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
 Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .004 inch before T.D.C., as indicated on Gauge.
 Spark Plugs—14-MM (Champion type J-7); Gap .025 inch.
 Firing Order—1-6-2-5-3-7-4.

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
1320	660	3
1800	900	5
2280	1140	7
3000 (Max.)	1500	10

Ignition Coil—Auto-Lite, CE-4001-G.

Ignition Switch—Oakes Steering Post and Ignition Lock.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAR-4603 (Belt Drive, Air Cooled)

Performance Data—Gen. Cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.2	10	1150	7.1
2	850	6.3	14	1400	7.6
4	900	6.5	16	1600	7.8
6	950	6.7	18	1800 (Max.)	8.
8	1050	7.			

Motoring Freely—5.2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5½ volts.

Field Test—4.1 amps. at 6 volts across field coils in series.

Field Fuse—7½ amps. (Type 1A-7½).

Brush Spring Tension—24 to 36 oz. on each (new brushes).

Armature—Auto-Lite, GAR-2077.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

Closes—6¾ to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .020 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. A-5640-A.

Location—Behind instrument board, operated by pull knob.

Tilt Control Switch—Located on instrument board. (For complete details of operation, see "1934 Control Beam Headlights", Sec. AA.)

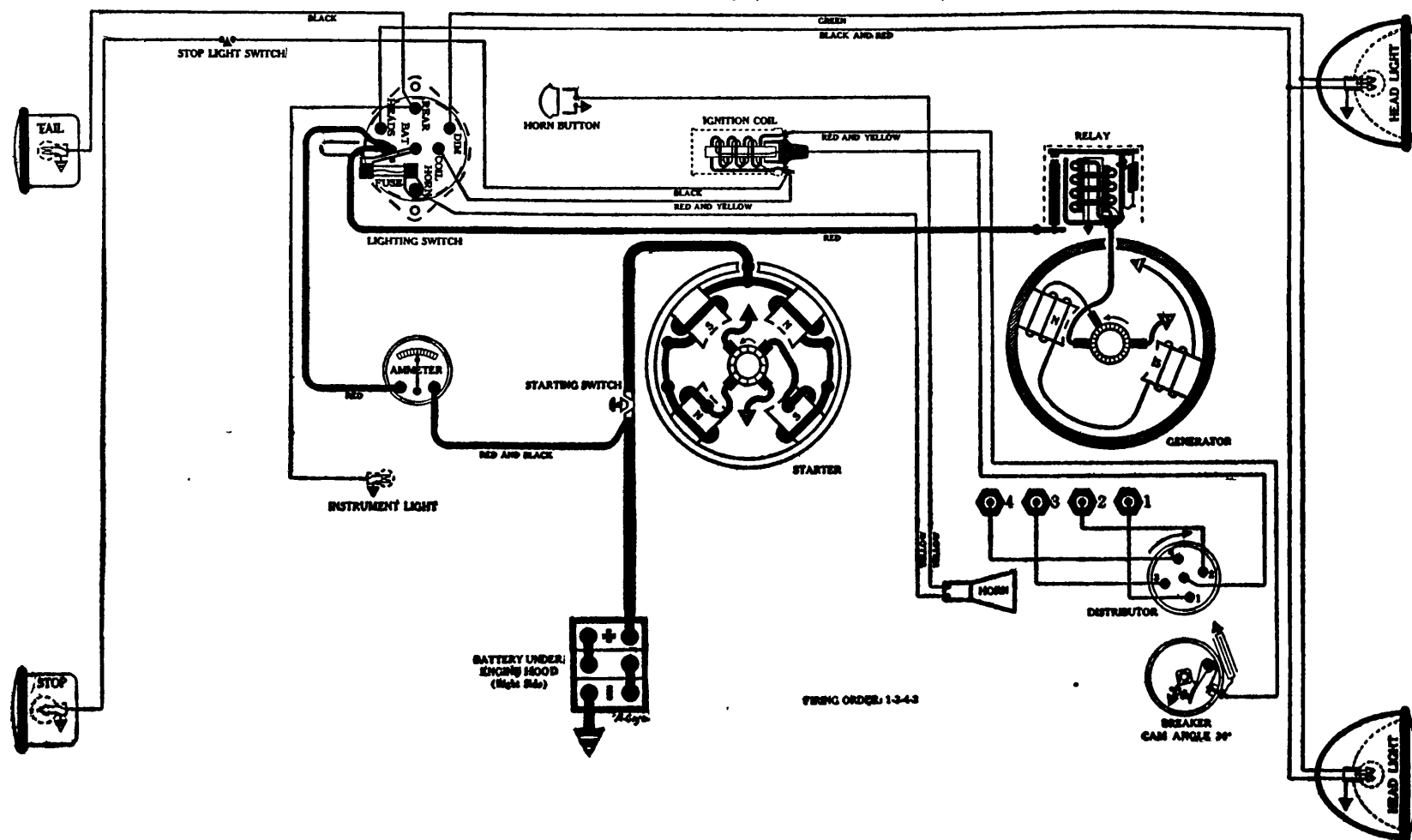
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch. Clock fuses, 6 amps. (type 1A-6) on clock.

Foot Selector Switch—Delco-Remy, 465-W.

Lamps—See Lamp Table, Sec. AA. HEAD—1000; PARK—63; INSTRUMENT—63; OIL INDICATOR—63; FRONT COMPARTMENT—63; CLOCK LAMP—63; DOME—81; STOP AND TAIL—1158 (Left Fender); TAIL—63 (Right Fender).

AUSTIN

Model 4 cyl., Third Series, (Late 1933-1934)



BATTERY

U.S.L., XY-9-A, 6 volts. Negative Terminal Grounded

Starting Capacity—70 amps. for 20 minutes.
Lighting Capacity—3 amps. for 20 hours (60 amp. hour).
Box—Length, 6-15/16; width, 7; height, 8 5/8 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAK-4001

Connection to Engine—Bendix Drive, Type RCE-11-10. For details of operation, and instructions on assembling refer to Section AA.
Running Free—35 amps. at 5 1/2 volts.

Cranking Engine—130 amps. at 4.3 volts.
Lock Torque—7 pound-feet, 520 amps., 4 volts.
Brush Spring Tension—38 to 61 oz. on each (new brushes).
Starting Switch—Auto-Lite, SW-4001.
Armature—Auto-Lite, MAK-2006.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGB-4086-A

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 36 degrees; open 54 degrees.
Contact Spring Tension—17 to 19 oz.
Timing—Use MOTOR GAUGE. Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 8. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .020 inch (low compression head) or .004 inch (high compression head) before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—18-MM (AC type G-10); Gap .030 inch.
Firing Order—1-3-4-2.
Automatic Advance—11 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
1000	500	2
1400	700	4
1800	900	6
2200	1100	8
2800 (Max.)	1400	11

Ignition Coil—Auto-Lite, IG-4065.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAS-4104-B, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	825	6.4	12	1800	7.7
3	1000	6.8	14	2400 (Max.)	8.
6	1200	7.	14	2800	8.
9	1400	7.4			

Motoring Freely—4 1/2 amps. at 6 volts.
Max. Stall Current—29 amps. at 6 volts.
Field Test—3.8 amps. at 6 volts across field coils in series.
Brush Spring Tension—15 to 20 oz. on each.
Armature—Auto-Lite, GAS-2076.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014

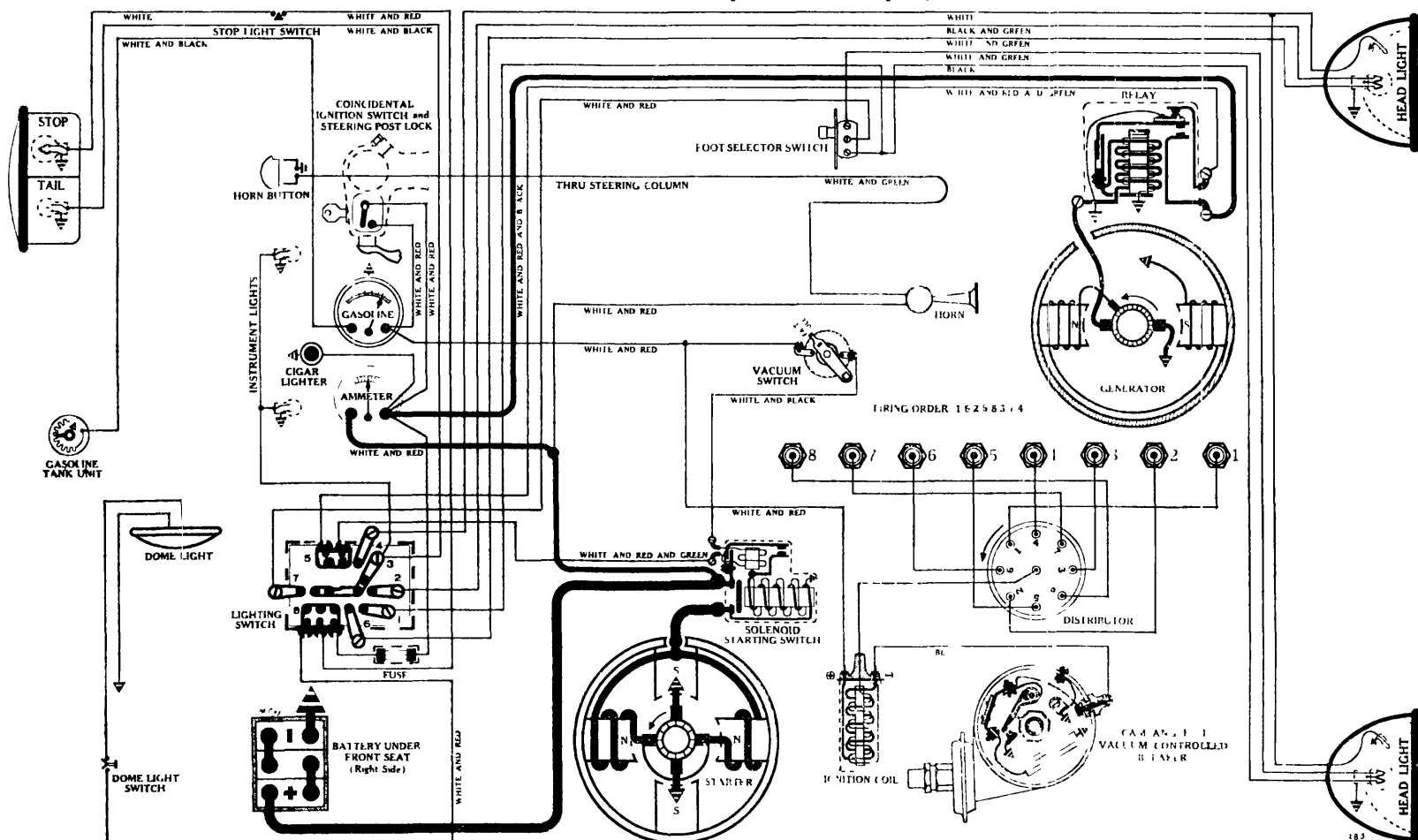
Closes—6 3/4 to 7 1/2 volts.
Opens—1/2 to 2 1/2 amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .020 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton No. 50518, Combination Lighting and Ignition.
Location—On instrument board.
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.
Lamps—See Lamp Table, Sec. AA. HEAD—1158; INSTRUMENT—68; STOP—87; TAIL—63.

Series 34-40, (1934)

NOTE: This car officially announced May 12, 1934



Delco-Remy, 13-J, 6 volts. Negative Terminal Grounded
Starting Capacity—117 amps. for 20 minutes.
Lighting Capacity—4.9 amps. for 20 hours (98 amp. hour).
Box—Length, 9-1/16; width, 7; height, 9 1/8 inches.

**Rotation, L. H., Com. End
Delco-Remy, 734-Z**

Connection to Engine—Mechanical pinion shift incorporating an over running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch, remote control relay (located in solenoid unit), and an auxiliary set of grounding points found on cut-out relay.

Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—175 to 190 amps. at 4.1 volts.
Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each (new brushes).
Starting Switch—Delco-Remy Solenoid, 1513.
Vacuum Starting Control Switch—Delco-Remy, 1594.
Armature—Delco-Remy, 823881.

**Rotation, L. H., Top View
Delco-Remy, 663-E**

(Full Automatic Spark Advance in conjunction with Vacuum Operated Advance, which controls position of Breaker Mounting Plate.)

Cam Angles—Points closed 31 degrees; open 14 degrees.
Contact Spring Tension—19 to 23 oz.

Installing a Distributor—1. See that cork seal is in place. 2. Vacuum connection should point to rear, and be parallel with center line of engine. 3. Turn distributor shaft until rotor is under No. 1 Dist. Cap Terminal. 4. By means of a screw driver, turn slot in oil pump shaft so that it will line up with pin in bottom of dist. shaft. Drop unit into place.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark (cut in flywheel and filled with white paint, located 2 degrees ahead of T.D.C.) is opposite index line on flywheel housing. With water under No. 1 Dist. Cap Terminal, breaker points should just open. This setting is for regular gasoline. When Ethyl gasoline is used the ignition should have an advance of 8 degrees (flywheel). As only a 2 degree flywheel advance mark is provided, the engine must first be timed for regular gasoline. Next loosen dist mounting screws and turn complete distributor in a clockwise direction until index line on pointer is three graduations from the center line of scale. Relock mounting screws.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 31. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .002 inch (regular gasoline) or .019 (Ethyl gasoline) before T.D.C., as indicated on Gauge.

Spark Plugs—18-MM (AC type H-9); Gap .020 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.
Vacuum Advance—5 degrees (Distributor).

Automatic Advance	15 degrees (Distributor).	
Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
440	220	Start
590	295	3
800 (Intermediate)	400	7
1700	850	11
2600 (Max.)	1300	15

Ignition Coil—Delco-Remy, 528-H.
Ignition Switch—Oakes Steering Post and Ignition Lock.

Rotation, L. H., Com. End
Delco-Remy, 935-K, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
2	700	6.4	10	1000	7.1
5	800	6.6	15	1400	7.5
8	900	6.9	19	2400 (Max.)	8.

Motoring Freely—4 amps. at 6 volts.
Max. Stall Current—22 amps. at 6 volts.
Field Test—2.3 amps. at 6 volts across field coils in series.
Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).
Armature—Delco-Remy, 1854856.
Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

Cut-Out Relay, Delco-Remy, 265-T

NOTE: This is a new type unit with an extra terminal which is grounded through an auxiliary set of points when the cut out points are open.

Closes—7 to 7½ volts.
Opens—0 to 2½ amps. discharge.
Contact Gap—.015 to .025 inch.
Core Gap—.012 to .017 inch, contacts closed.

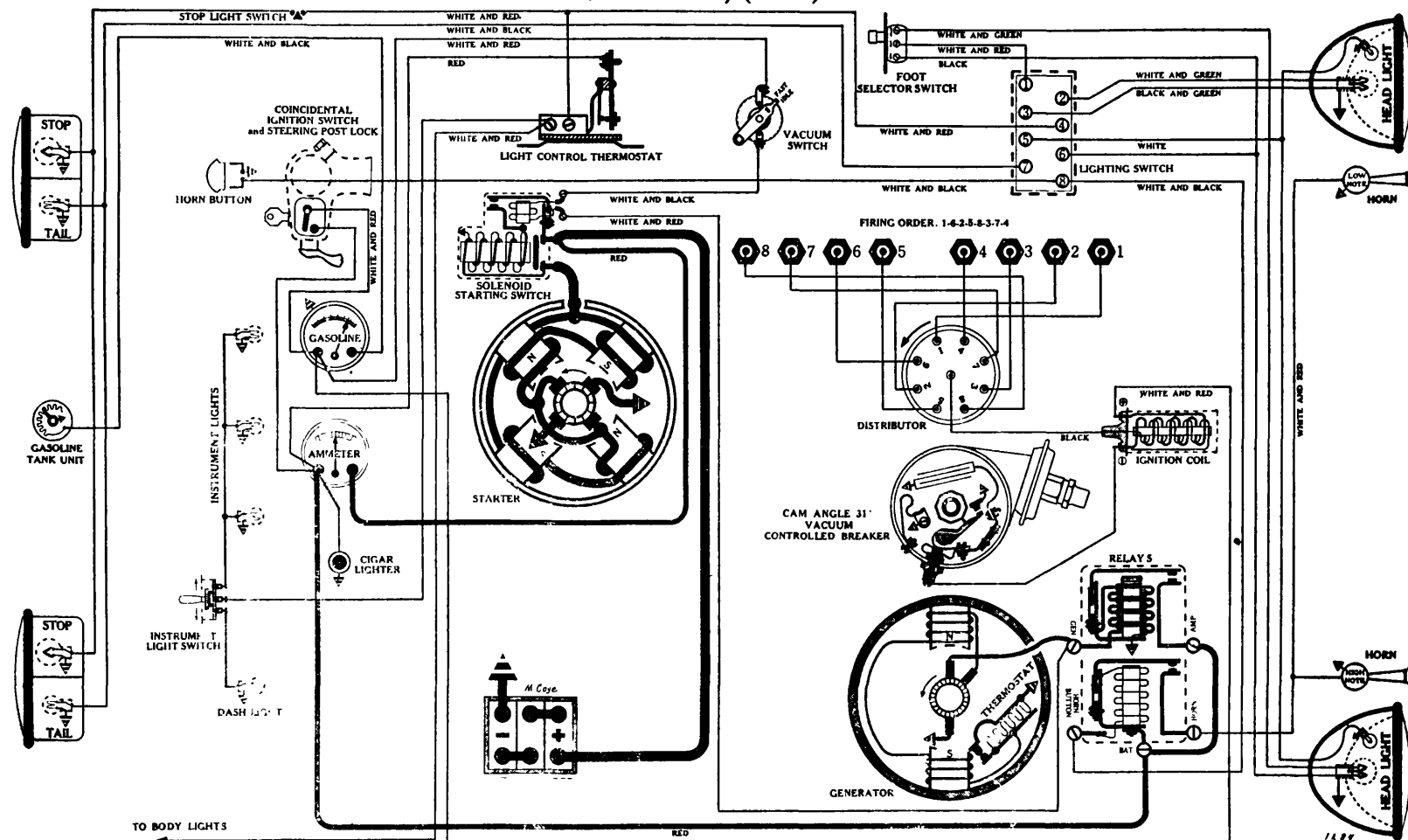
Solenoid Relay, (located in Solenoid Unit)

Closes—3.6 to 4 volts (max.).
Opens—1.6 to 2 volts.
Contact Gap—.030 to .045 inch.
Core Gap—.010 to .014 inch, contacts closed

Switch—Delco-Remy, 478-S.
Location—Behind instrument board, operated by pull knob.
Fuses—Single 30 amp. fuse (type 3A-30) in tubular holder found on wire connecting ammeter to No. 8 terminal on lighting switch.
Foot Selector Switch—Delco-Remy, 465-R.
Lamps—See Lamp Table, Sec. AA. **HEAD**—2320-C*; **PARK**—63; **INSTRUMENT**—63; **DOVE**—81; **STOP**—81; **TAIL**—63. A new type bulb.

BUICK

Series 34-50, (1934)



BATTERY

Delco-Remy, 13-J, 6 volts. Negative Terminal Grounded

Starting Capacity—117 amps. for 20 minutes.

Lighting Capacity—4.9 amps. for 20 hours (98 amp. hour).

Box—Length, 9-1/16; width, 7; height, 9 1/2 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 727-G

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch and a remote control relay (located in solenoid unit), the control relay being grounded through the generator.

Running Free—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—170 to 185 amps. at 4.1 volts.

Lock Torque—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy Solenoid, 1513.

Vacuum Starting Control Switch—Delco-Remy, 1587.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 663-C

(Full Automatic Spark Advance in conjunction with Vacuum Operated Advance, which controls position of Breaker Mounting Plate.)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—IMPORTANT! First set octane selector to extreme "high", and timing plate in advanced position. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "Adv" (cut in flywheel 7 degrees ahead of the "T.D.C." mark) is opposite index line on flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 38. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .018 inch before T.D.C., as indicated on Gauge.

Spark Plugs—18-MM (AC type H-9); Gap .020 to 0.25 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance—6 degrees (Distributor).

Automatic Advance—10 1/2 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
420	210		3
580	290		5
700	350		7
800 (Intermediate)	400		9
1260	630		10 1/2
1600 (Max.)	800		

Ignition Coil—Delco-Remy, 528-H.

Ignition Switch—Oakes Steering Post and Ignition Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 956-H

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.3	16	1160	7.8
4	680	6.7	20	1520	8.
12	950	7.4	22	2000 (Max.)	8.3

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—3 amps. at 6 volts (without distributor).

Max. Stall Current—25 to 26 amps. at 6 volts.

Field Test—2.1 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 26 oz. (new brushes).

Armature—Delco-Remy, 1845920.

Third Brush Adjustment—Loosen cover band. See Fig. 27, "Third Brush Adjustment" page, Sec. AA.

RELAYS

Delco-Remy, 264-H

(A combination of Cut-Out Relay and Horn Relay)

NOTE: If unit has six terminals see Buick, Models 34-60 and 90 (1934) Wiring Diagram for connections.

Cut-Out Relay—Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to 0.17 inch, contacts closed.

Horn Relay—Closes—4 volts.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

Solenoid Relay (Located in Solenoid Unit):

Closes—3.6 to 4 volts (max.).

Opens—1.6 to 2. volts.

Contact Gap—.020 to .045 inch.

Core Gap—.010 to .014 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 487-F.

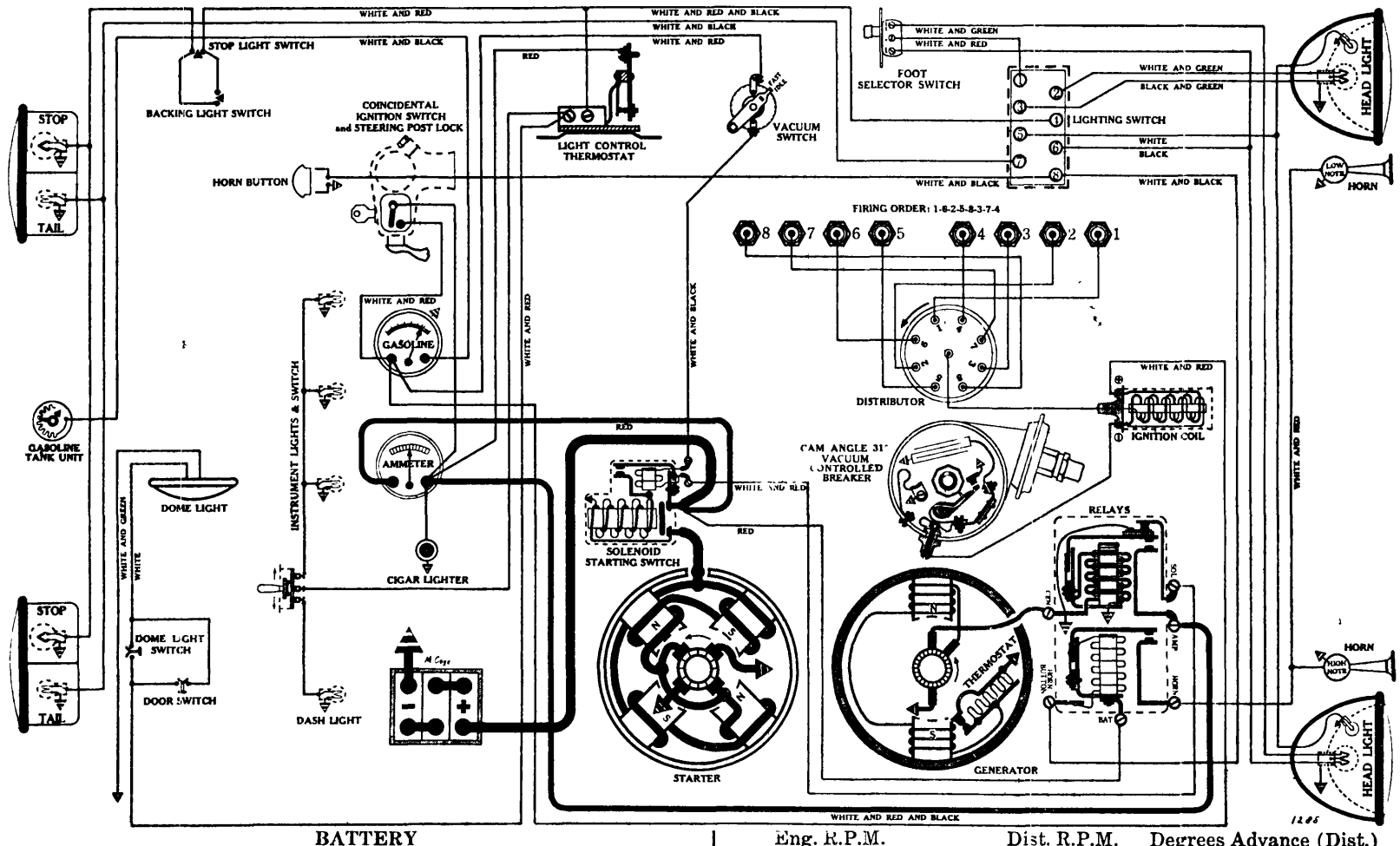
Thermostatic Lighting Current Limit Relay—Delco-Remy, 411-A.

Foot Selector Switch—Delco-Remy, 465-R.

Lamps—See Lamp Table, Sec. AA. HEAD—2330*; PARK—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63. A new type bulb.

BUICK

Series 34-60 and 34-90, (1934)



MODEL 34-60:—

Delco-Remy, 15-G, 6 volts. Negative Terminal Grounded
Starting Capacity—137 amps. for 20 minutes.
Lighting Capacity—5.7 amps. for 20 hours (114 amp. hour).
Box—Length, 10-9/32; width, 7; height, 9 1/2 inches.

MODEL 34-90:—

Delco-Remy, 17-D, 6 volts. Negative Terminal Grounded
Starting Capacity—156 amps. for 20 minutes.
Lighting Capacity—6.5 amps. for 20 hours (130 amp. hour).
Box—Length, 11 1/4; width, 7; height, 9 1/2 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 727-F

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch, remote control relay (located in solenoid unit), and an auxiliary set of grounding points found on cut-out relay.

Running Free—65 amps. at 5 volts, 5500 R.P.M.
Cranking Engine—185 to 200 amps. at 4 volts.
Lock Torque—16 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each (new brushes).
Starting Switch—Delco-Remy Solenoid, 1512.
Vacuum Starting Control Switch—Delco-Remy, 1587
Armature—Delco-Remy, 820158.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 663-A

(Full Automatic Spark Advance in conjunction with Vacuum Operated Advance, which controls position of Breaker Mounting Plate.)

Breaker—Contact separation .015 inch.
Cam Angles—Points closed 31 degrees; open 14 degrees.
Contact Spring Tension—19 to 23 oz.
Timing—IMPORTANT! First set octane selector to extreme "high", and timing plate in advanced position. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "Adv" (which on the 34-60 is cut in flywheel 11 degrees, and on the 34-90, 10 degrees ahead of the "T.D.C." mark) is opposite index line on flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 31. Slowly turn engine until No. 1 piston is coming up on compression stroke. On Model 34-60 stop when .049 inch, and on Model 34-90 stop when .044 inch before T.D.C., as indicated on Gauge.
Spark Plugs—18-MM (AC type H-9); Gap .020 to .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Vacuum Advance—6 degrees (Distributor).
Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
440	220	Start
590	295	3
800 (Intermediate)	400	7
1700	850	11
2600 (Max.)	1300	15

Ignition Coil—Delco-Remy, 528-H.

Ignition Switch—Oakes Steering Post and Ignition Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 956-H

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.3	16	1160	7.8
4	680	6.7	20	1520	8.
12	950	7.4	22	2000 (Max.)	8.3

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—3 amps. at 6 volts (without distributor).

Max. Stall Current—25 to 26 amps. at 6 volts.

Field Test—2.1 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 26 oz. (new brushes).

Armature—Delco-Remy, 1845920.

Third Brush Adjustment—Loosen cover band. See Fig. 27, "Third Brush Adjustment" page, Sec. AA.

RELAYS

Delco-Remy, 264-K

(A combination of Cut-Out Relay and Horn Relay, with an extra set of grounding contacts on the Cut-Out Relay).

NOTE: If unit has but five terminals see Buick, Model 34-50 (1934) Wiring Diagram for connections.

Cut-Out Relay—Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to 0.17 inch, contacts closed.

Horn Relay

Closes—4 volts.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

Solenoid Relay (Located in Solenoid Unit):

Closes—3.6 to 4 volts (max.).

Opens—1.6 to 2. volts.

Contact Gap—.020 to .045 inch.

Core Gap—.010 to .014 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 487-F.

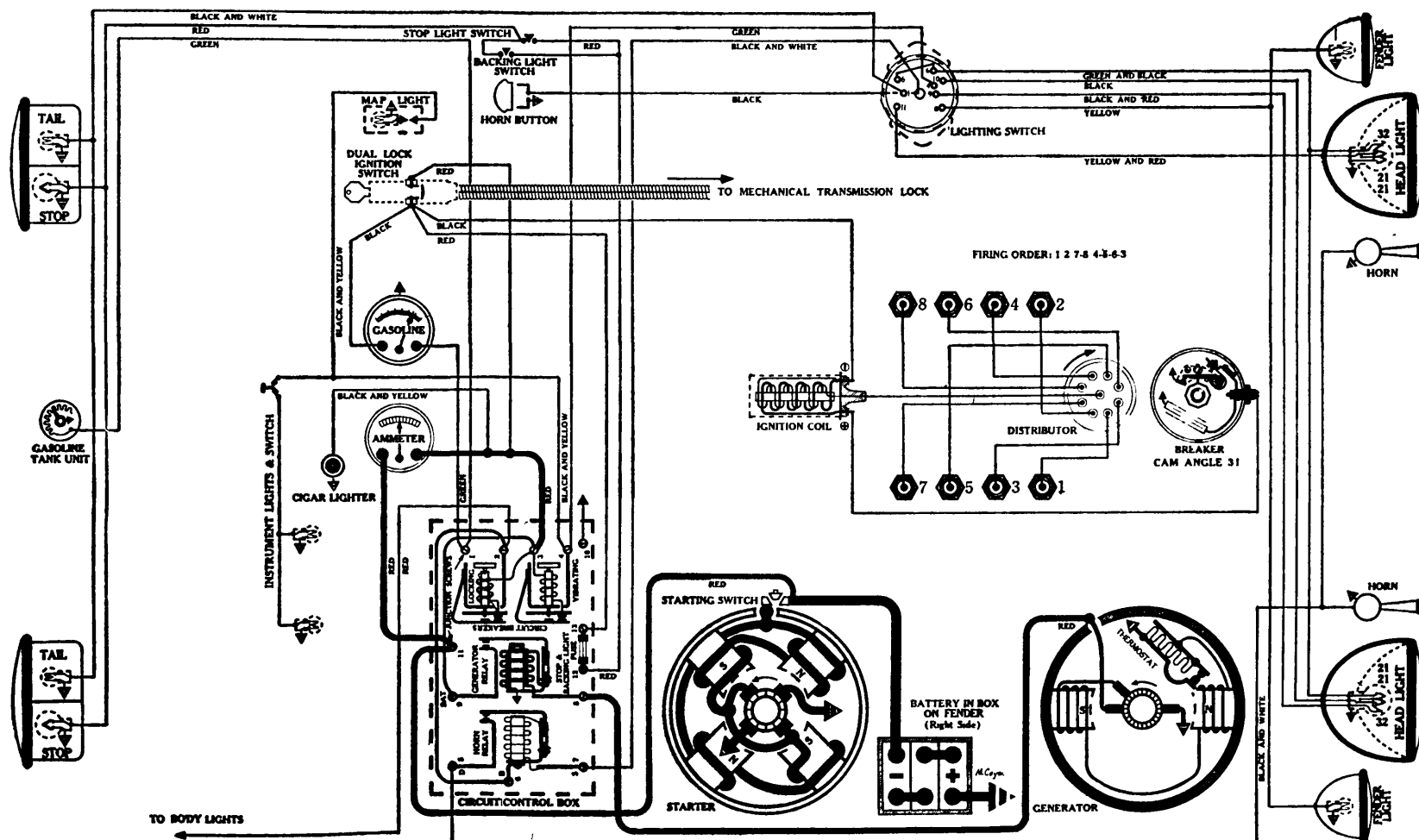
Thermostatic Lighting Current Limit Relay—Delco-Remy, 411-A.

Foot Selector Switch—Delco-Remy, 465-R.

Lamps—See Lamp Table, Sec. AA. HEAD—2330*; PARK—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—68. *A new type bulb.

CADILLAC

Mod 1 355-C, 90 degree "Vee" 8, (Late 1933)



BATTERY

Delco-Remy, 17-C, 6 volts. Positive Terminal Grounded

Starting Capacity—156 amps. for 20 minutes.
Lighting Capacity—6.5 amps. for 20 hours (130 amp. hour).
Box—Length, 11 $\frac{1}{4}$; width, 7; height, 9 $\frac{1}{2}$ inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 728-P

Connection to Engine—Mechanical Gear Shift, incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starter. Gear reduction job.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—245 to 260 amps. at 4 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 661-P

(Full Automatic Spark Advance)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—With No. 1 piston on compression stroke, flywheel mark "IG-A" (which is 1-3/16 inches ahead of T.D.C.) opposite indicator, rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 29. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .036 inch before T.D.C., as indicated on Gauge.

Spark Plugs—18-MM (AC type G-7); Gap .025 to .028 inch.

Firing Order—1-2-7-8-4-5-6-3.

NOTE: All odd cylinder numbers on right bank, No. 1 nearest radiator. All even numbers on left bank (see diagram).

Automatic Advance—5 $\frac{1}{2}$ degrees (Distributor).

Eng. R.P.M.

Dist. R.P.M.

Degrees Advance (Dist.)

340	170	Start
680	340	2
1000 (Intermediate)	500	3 $\frac{1}{2}$
1080	540	4
1440	720	5
1600 (Max.)	800	5 $\frac{1}{2}$

Ignition Coil—Delco-Remy, 528-G.

Ignition Switch—Delco-Remy, 426-T "Dual Lock". (Combination Ignition Switch and Mechanical Transmission Lock).

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-S (Air Cooled)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	450	6.4	16	720	7.8
8	540	7.	20	840	8.
12	600	7.4	24	1400 (Max.)	8.4

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—4 $\frac{1}{2}$ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 6 volts.

Field Test—4 $\frac{1}{2}$ amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each (new brushes).

Armature—Delco-Remy, 1843113.

Third Brush Adjustment—Loosen cover band. Loosen long hexagonal screw which releases third brush mounting plate, shift brush by hand; relock.

RELAY

Located in Delco-Remy, 480-Z Circuit Control Box
(Together with Circuit Breakers and Horn Relay)

Mounted on Dash under Cowl

Closes—7 to 7 $\frac{1}{2}$ volts.

Opens—0 to 2 $\frac{1}{2}$ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-S, or 487-A.

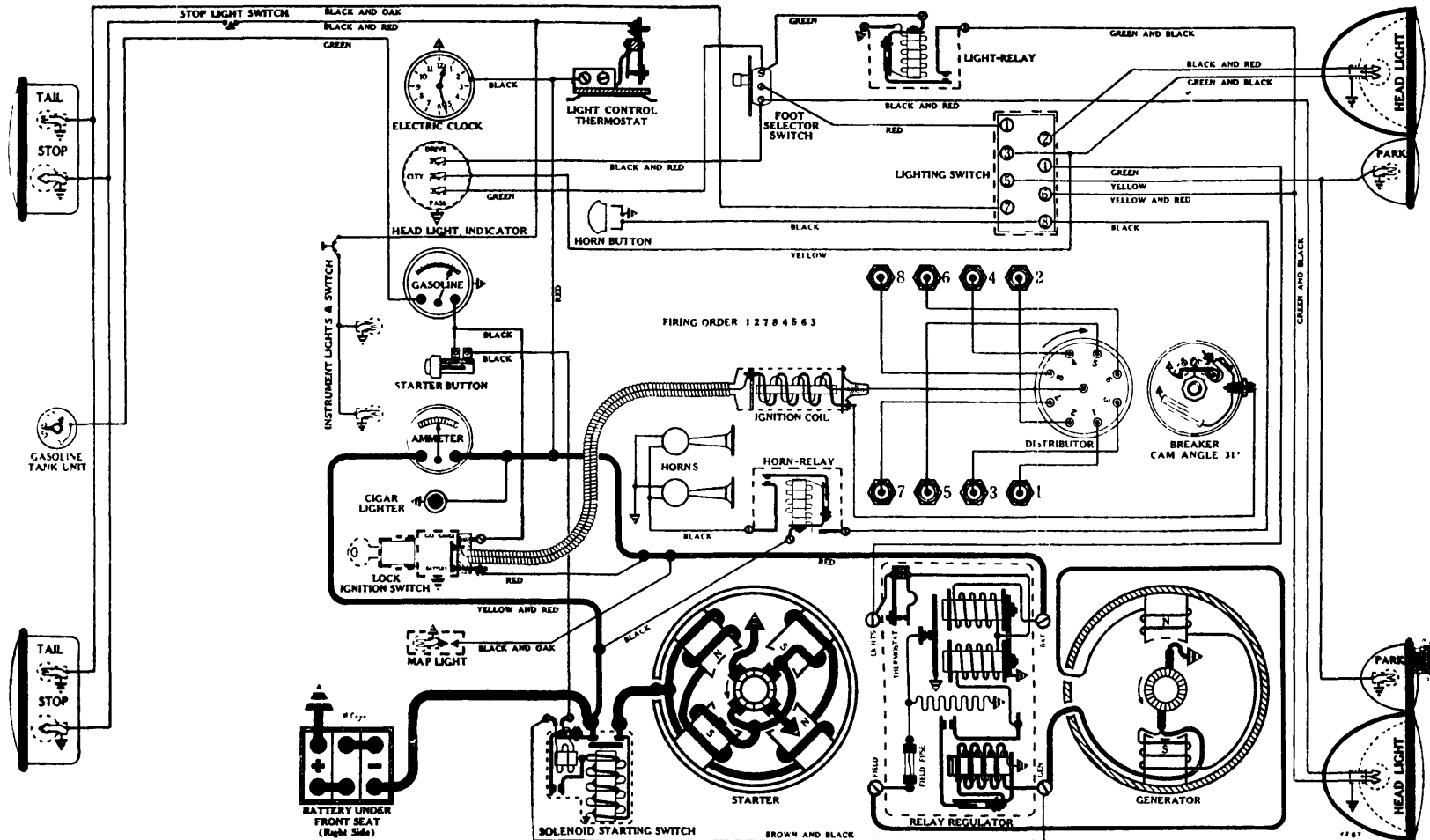
Location—Foot of steering column. Lights controlled by lever on steering wheel.

Circuit Breakers—Vibrating unit—Starts 35 to 40 amps. Operates 5 to 15 amps. Lock-out unit—Opens 25 to 30 amps. Operates with discharge less than 1 amp.

Lamps—See Lamp Table, Sec. AA. HEAD—3001; FENDER—63; INSTRUMENT—63; CORNER—81; DOME—81; TAIL—63; STOP AND BACK—87.

CADILLAC

Model 355-D, 90 degr "V e" 8, (1934)



Factory blue prints and specifications call for stop light feed to be taken from thermostat, as shown on this diagram. On cars checked we find stop light feed taken from gas gauge side of lock ignition switch, which means that stop light is "dead" with ignition "off". For proper connections see 1934 LaSalle diagram.

BATTERY

Delco-Remy, 17D, 6 volts. Positive Terminal Grounded

Starting Capacity—156 amps. for 20 minutes.

Lighting Capacity—6.5 amps. for 20 hours (130 amp. hour).

Box—Length, 11 $\frac{1}{2}$; width, 7; height, 9 $\frac{1}{2}$ inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 728-U

Connection to Engine—Mechanical pinion shift with self-contained gear reduction and over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board working in conjunction with a remote control relay (located in solenoid unit), the control relay being grounded through the generator.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—250 to 270 amps. at 3.9 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy Solenoid, 1514 or 1521.

Push Button Starting Control Switch—Delco-Remy, 1379.

Armature—Delco-Remy, 818134.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 661-V

(Full Automatic Spark Advance)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel "IG-A" (which is 4 degrees or approximately $\frac{1}{2}$ inch ahead of T.D.C.) is opposite indicator. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .012 inch before T.D.C., as indicated on Gaug.

Spark Plugs—18-MM (AC type G-7); Gap .025 to .028 inch.

Firing Order—1-2-7-8-4-5-6-3.

NOTE: All odd cylinder numbers on right bank, No. 1 nearest radiator. All even numbers on left bank (see diagram).

Automatic Advance—12 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
920	460		2
1160	580		4
1400	700		7
1780	890		10
2160	1080		12
2400 (Max.)	1200		

Coil and Lock Switch Assembly—Delco-Remy, 539-D.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 933-B (Air Cooled)

NOTE: This unit is a straight shunt generator with no third brush. Generator output is controlled by a vibrating point current regulator working in conjunction with the lamp load. The regulator must be used when testing these generators. Generator data same as Cadillac "Vee" 12, 1934.

RELAY—REGULATOR

Same as Cadillac "Vee" 12, 1934.

LIGHTING

Switch—Delco-Remy, 487-H or 487-J.

Horn Relay—Delco-Remy, 266-T.

Thermostatic Lighting Current Limit Relay—Delco-Remy, 411-A.

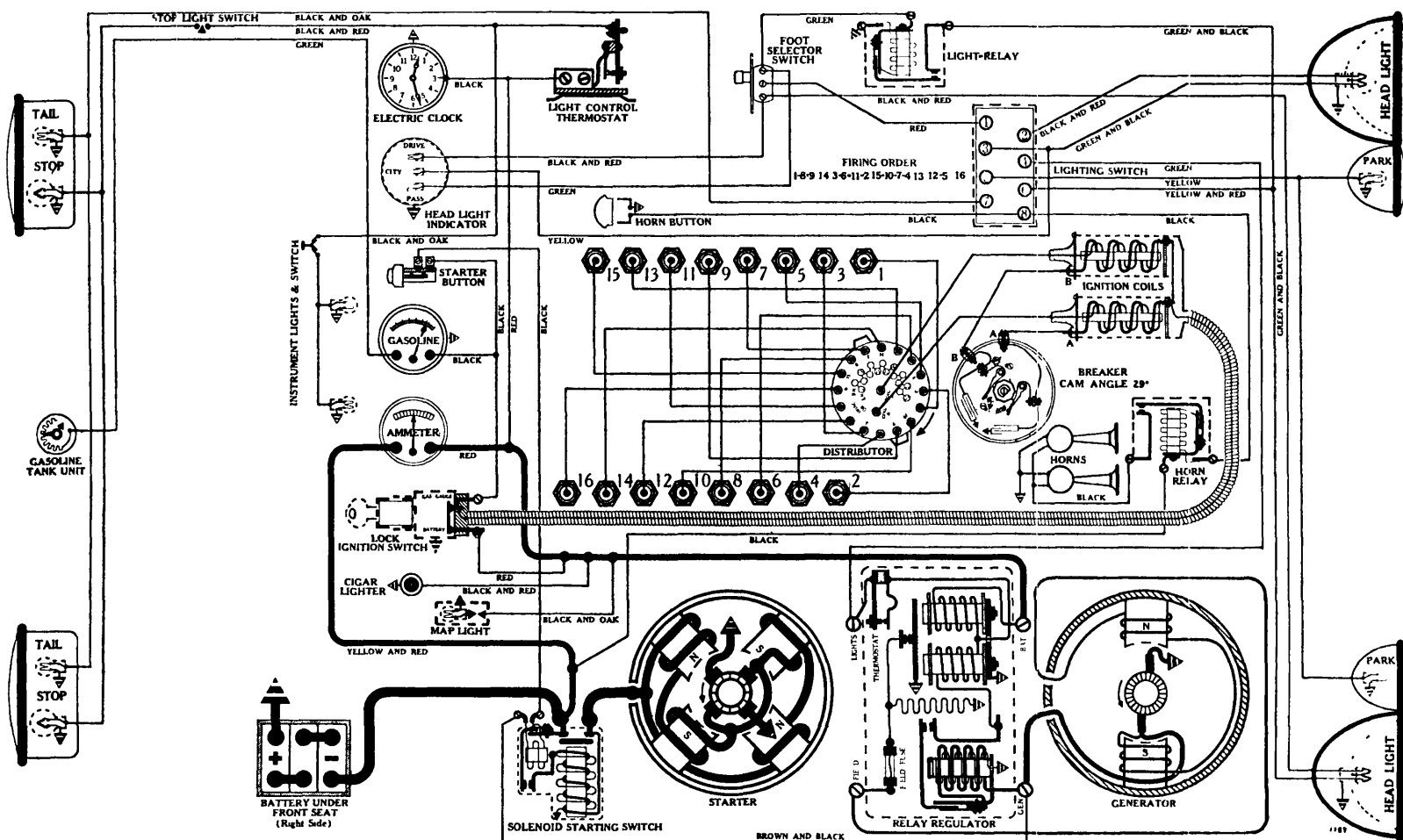
Lighting Relay—Delco-Remy, 266-T.

Foot Selector Switch—Delco-Remy, 465-Z.

Lamps—See Lamp Table, Sec. AA. HEAD—2330*; PARK—63; INSTRUMENT—63; DOME—81; HEAD LIGHT INDICATORS—40**; STOP—87; TAIL—63. *A new type bulb. **6 volt, miniature screw base, radio panel bulb.

CADILLAC

Model 452-D, 45 degree "Vee" 16, (1934)



Factory blue prints and specification call for stop light feed to be taken from thermostat, as shown on this diagram. On cars checked we find stop light feed taken from gas gauge side of lock ignition switch, which means that stop light is "dead" with ignition "off". For proper connections see 1934 LaSalle diagram.

BATTERY

Delco-Remy, 25-A, 6 volts. Positive Terminal Grounded

Starting Capacity—234 amps. for 20 minutes.

Lighting Capacity—9.8 amps. for 20 hours (196 amp. hour).

Box—Length, 16 3/16; width, 7; height, 9 3/16 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 580

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board working in conjunction with a remote control relay (located in solenoid unit), the control relay being grounded through the generator.

Running Free—70 amps. at 5.7 volts, 2200 R.P.M.

Cranking Engine—265 to 285 amps. at 4 volts.

Lock Torque—35 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—36 to 40 oz. on each (new brushes).

Starting Switch—Delco-Remy Solenoid, 1515.

Push Button Starting Control Switch—Delco-Remy, 1379.

Armature—Delco-Remy, 1837058.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 4118

Breakers—Contact separation .015 inch.

Cam Angles—Points closed 29 degrees; open 16 degrees.

Contact Spring Tension—17 to 21 oz. on each.

Synchronizing—Stationary points fire left hand block. Movable points open 22½ degrees after stationary. Equal 22½ degree intervals between interruptions.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "IG-A" (which is 4 degrees or approx. ½ inch ahead of T.D.C.) is opposite indicator. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 and rod No. 33. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .008 inch before T.D.C., as indicated on Gauge.

Spark Plugs—13-MM (AC type G-7); Gap .025 to .028 inch.

Firing Order—1-8-9-14-3-6-11-2-15-10-7-4-13-12-5-16.

NOTE:—All odd cylinder numbers on left bank. No. 1 nearest radiator. All even numbers on right bank (see diagram).

Automatic Advance—18 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
240	120	Start
640	320	3
1200 (Intermediate)	600	7½
1740	870	13
2200 (Max.)	1100	18

Ignition Coil Assembly—Delco-Remy, 553-E.

Lock Switch and Cable Assembly—Delco-Remy, 431-E.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 933-C (Air Cooled)

NOTE: This unit is a straight shunt generator with no third brush. Generator output is controlled by a vibrating point current regulator working in conjunction with the lamp load. The regulator must be used when testing these generators. Generator data—same as Cadillac "Vee" 12, 1934.

RELAY—REGULATOR

Same as Cadillac "Vee" 12, 1934.

LIGHTING

Switch—Delco-Remy, 487-H.

Horn Relay—Delco-Remy, 266-T.

Thermostatic Lighting Current Limit Relay—Delco-Remy, 411-A.

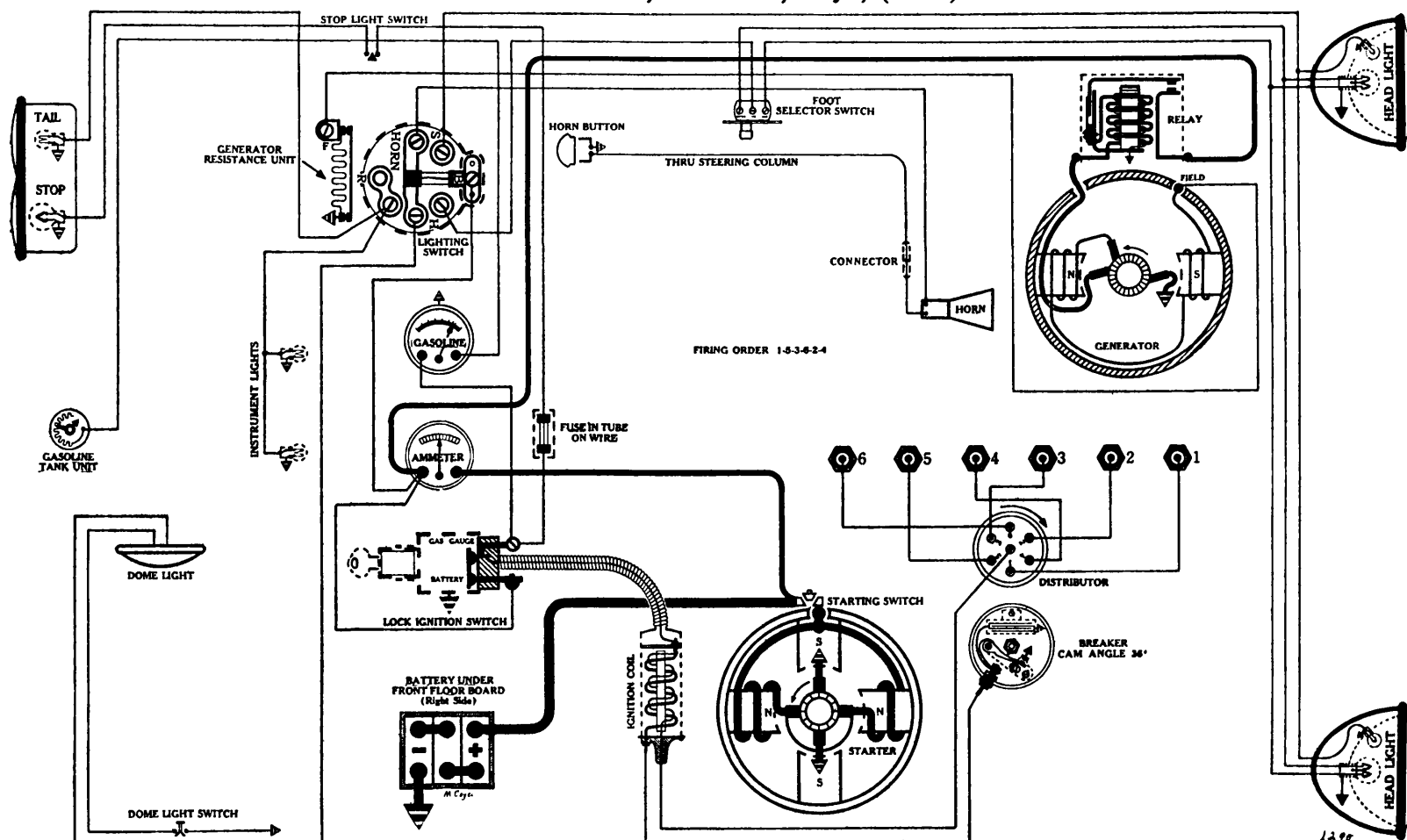
Lighting Relay—Delco-Remy, 266-T.

Foot Selector Switch—Delco-Remy, 465-Z.

Lamps—See Lamp Table, Sec. AA. HEAD—2330*; PARK—63; INSTRUMENT—63; DOME—81; HEAD LIGHT INDICATORS—40**; STOP—87; TAIL—63. *A new type bulb. **6 volt, miniature screw base, radio panel bulb.

CHEVROLET

Model "Master", Series DA, 6 cyl., (1934)



BATTERY

Delco-Remy, 15-P, 6 volts. Negative Terminal Grounded

Starting Capacity—115 amps. for 20 minutes.

Lighting Capacity—4.7 amps. for 20 hours (94 amp. hour).

Box—Length, 8-11/16; width, 7; height, 8-9/16 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 734-S

Connection to Engine—Bendix Drive, Type A-1667. For details of operation and instructions on assembling refer to "1934 Barrel Type Bendix Drives", Section "AA".

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—165 to 175 amps. at 4.3 volts.

Lock Torque—12 pound-feet, 475 amps., 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 362941 (on starter).

Starterator Vacuum Unit—Delco-Remy, 1575.

Armature—Delco-Remy, 1847432.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 644-R

(Full Automatic Spark Advance in conjunction with Delco-Remy, 680-L Vacuum Advance)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 36 degrees; open 24 degrees.

Contact Spring Tension—17 to 21 oz.

Timing—IMPORTANT! First set pointer on octane selector at zero graduation. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when steel ball, pressed in flywheel (located 10 degrees or 2½ flywheel teeth ahead of T.D.C.) is opposite pointer at opening in right side of flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 in conjunction with special 14-MM fitting No. 152, and rod No. 33. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston is .035 inch before T.D.C., as indicated on Gauge.

Spark Plugs—14-MM (AC type K-10): Gap .032 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance—8½ degrees (Distributor).

Octane Selector—5 degrees advance or retard (Distributor).

Automatic Advance—18½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
500	250	Start
1300	650	5
2200 (Intermediate)	1100	10¾
2700	1350	15
3100 (Max.)	1550	18½

Coil and Lock Switch Assembly—Delco-Remy, 538-C.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 935-B, (Belt Drive)

NOTE: Use the following data when adjusting unit in a test bench. If adjustments are to be made with unit on car read data on 1934 Lamp Control Generators, Sec. AA.

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
2	700	6.4	10	1000	7.1
5	800	6.6	15	1400	7.5
8	900	6.9	19	2400 (Max.)	8.

Motoring Freely—4 amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—2.3 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-H

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-P (with generator field resistance).

Location—Behind instrument board. Operated by pull knob.

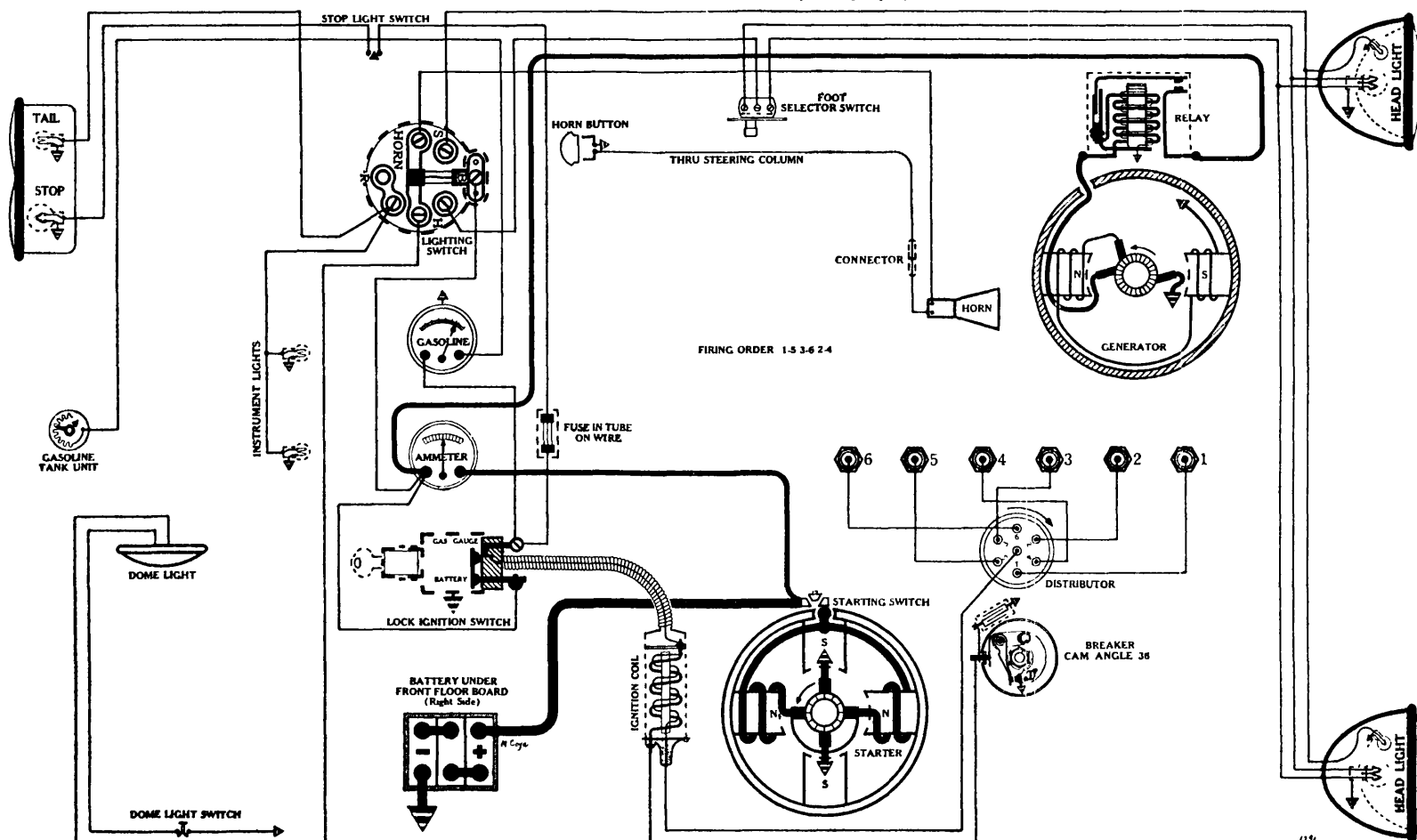
Fuses—Lighting Circuit, Single 20 amp. fuse (type 3A-20) mounted on switch back. Stop Light Circuit, Single 20 amp. fuse (type 3A-20) in tubular holder in wire behind instrument board near ignition switch.

Foot Selector Switch—Delco-Remy, 465-A.

Lamps—See Lamp Table, Sec. AA. HEAD—2320-C*; PARK—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63. *A new type bulb.

CHEVROLET

Mod 1 "Standard" Series DC, 6 cyl., (1934)



BATTERY

Delco-Remy, 13-N, 6 volts. Negative Terminal Grounded

Starting Capacity—102 amps. for 20 minutes.
Lighting Capacity—4.3 amps. for 20 hours (86 amp. hour).
Box—Length, 9-11/16; width, 7-1/16; height, 8-11/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 714-L

Connection to Engine—Bendix Drive, Type R11-10.
Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—165 to 175 amps. at 4.3 volts.
Lock Torque—12 pound-feet, 475 amps., 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each (new brushes).
Starting Switch—Delco-Remy, 362941 (on starter).
Starterator Vacuum Unit—Delco-Remy, 1575.
Armature—Delco-Remy, 818002.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 622-L

(Full Automatic Spark Advance in conjunction with Delco-Remy, 680-F Vacuum Advance)

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 36 degrees; open 24 degrees.
Contact Spring Tension—17 to 21 oz.

Timing—IMPORTANT! First set pointer on octane selector at zero graduation. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when steel ball, pressed in flywheel (located 10 degrees or 2½ flywheel teeth ahead of T.D.C.) is opposite pointer at opening in right side of flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 113 in conjunction with special 14-MM fitting No. 152, and rod No. 19. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston is .030 inch before T.D.C., as indicated on Gauge.

Spark Plugs—14-MM (AC type K-9); Gap .032 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance—6 degrees (Distributor).

Octane Selector—5 degrees advance or retard (Distributor).

Automatic Advance—16 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
460	230	Start
1020	510	4
1580	790	8
2140	1070	12
2700 (Max.)	1350	16

Coil and Lock Switch Assembly—Delco-Remy, 538-C.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 943-J, (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	16	1650	8.
5	850	7.1	18	1850 (Max.)	8.2
12	1250	7.8	17	2000	8.2

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—3½ amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each (new brushes).

Armature—Delco-Remy, 817221.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page. Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-H.

Location—Behind instrument board. Operated by pull knob.

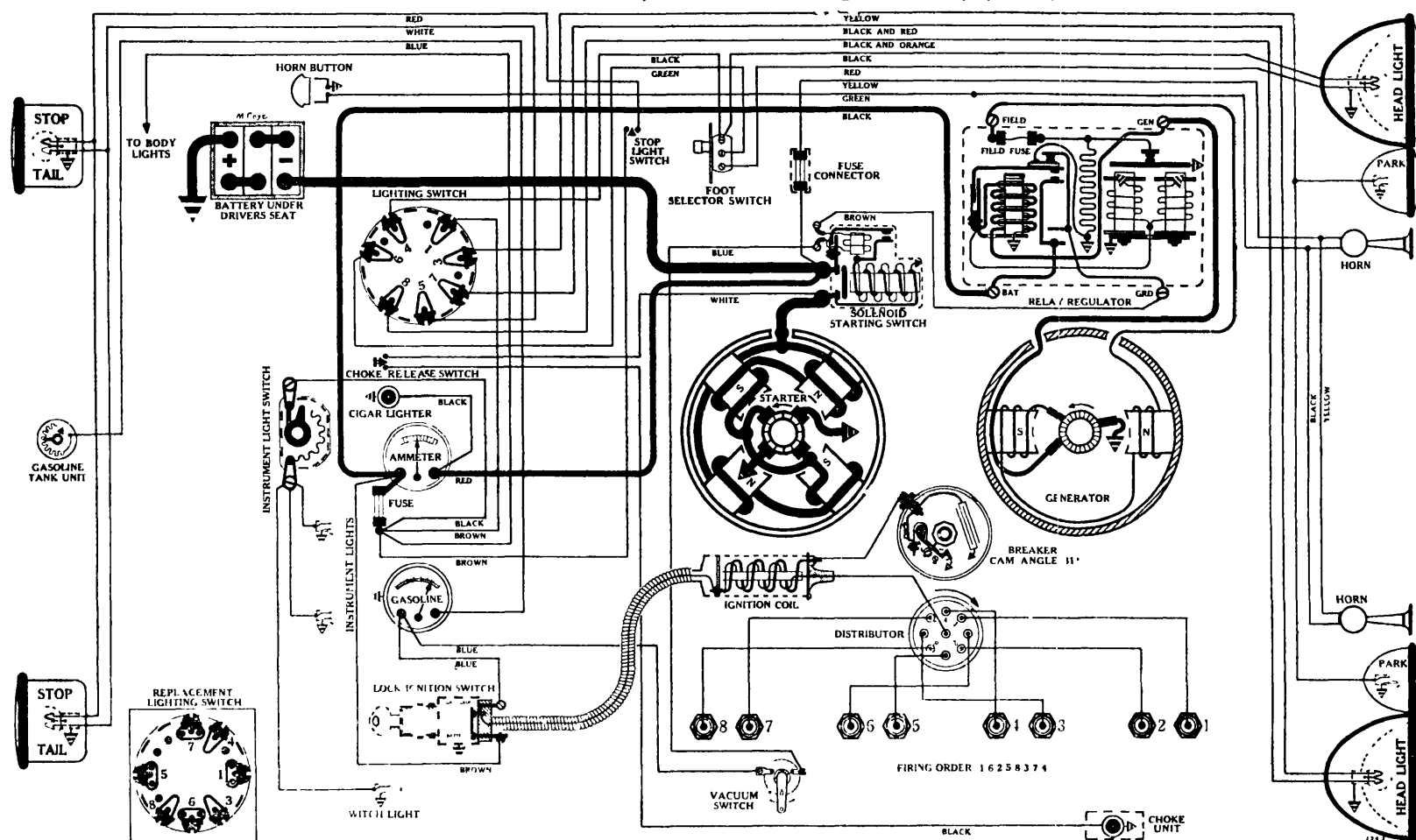
Fuses—Lighting Circuit, Single 20 amp. fuse (type 3A-20) mounted on switch back. Stop Light Circuit, Single 20 amp. fuse (type 3A-20) in tubular holder in wire behind instrument board, near ignition switch.

Foot Selector Switch—Delco-Remy, 465-Z.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; PARK—63; INSTRUMENT—63; DOME—81; STOP—63; TAIL—63.

CHRYSLER

Models CU and CV, "Airflow" Straight Eights, (1934)



BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded
 Starting Capacity—160 amps. for 20 minutes.
 Lighting Capacity—6.8 amps. for 20 hours (136 amp. hour).
 Box—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 727-J

Connection to Engine—Mechanical pinion shift incorporating an overrunning clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch, remote control relay (located in solenoid unit), and an auxiliary set of grounding points found in cut-out relay.

Running Free—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—165 to 190 amps. at 4 volts.

Lock Torque—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy Solenoid, 1516.

Vacuum Starting Control Switch—Delco-Remy, 1592.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 661-S, 661-T

(Full Automatic Spark Advance on both)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. On Model "CU" engines with 661-S distributor, stop when the zero mark on the vibration dampener (which is at exact T.D.C.) has moved six graduations past the pointer on gear case cover. On Model "CV" engines with 661-T distributor stop when zero mark is exactly under the pointer. With rotor under No. 1 Dist. Cap. Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove the 1/8 inch pipe plug (located above No. 1 piston) and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12, or remove No. 1 spark plug and attach Gauge, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. On "CU" engines with 661-S distributor, continue to turn until piston starts down on power stroke. Stop when .015 inch after T.D.C., as indicated on Gauge. On "CV" engines with 661-T distributor, stop at exact T.D.C.

Spark Plugs—14-MM (AC type SL-9); fixed gap .025 inch.

NOTE: This is a new type plug with a fixed gap which cannot be changed or adjusted. Use only a piano wire type of thickness gauge when checking gap. If out of adjustment replace with a new AC plug of same type, which has a threaded length of 7/16 inches.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—13 degrees (Distributor) on both.

NOTE: This is the spark table for 661-S distributor. For 661-T refer to Chrysler, Model CQ, 1933 diagram and data.

Eng. R.P.M.

Dist. R.P.M.

Degrees Advance (Dist.)

450	225	Start
600	300	3
840 (Intermediate)	420	7 1/2
1700	850	11
2200 (Max.)	1100	13

Coil and Lock Switch Assembly—Delco-Remy, 540-F.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 935-G, (Belt Drive)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.2	12	1200	7.5
4	900	7.	16	1600	7.8
8	1050	7.2	20	2600 (Max.)	8.1

Motoring Freely—5 1/2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 49 volts.

Field Test—2 amps. at 6 volts across field coils in series.

Field Fuse—6 amp. (Type 3A-6) in regulator box.

Brush Spring Tension—22 to 26 oz. on main; 16 to 20 oz. on third (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY—REGULATOR

Delco-Remy, 5544

A combination of Cut-Out Relay and Voltage Operated Two Stage Lock-Out Regulator

Cut-Out Relay: Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

Regulator: Core Gap—.038 inch (armature down).

Contact Opening—.008 to .013 inch (armature down).

Spring Tension—3/4 oz. (measured at contact).

Gap between Stop and Fiber Bumper—.028 inch (armature released).

LIGHTING

Switch—Chrysler, No. 614370.

Location—Behind instrument board.

Fuses—(Lighting)—Single 20 amp. fuse (type 3A-20), mounted on back of ammeter. (Horn)—20 amp. (type 3A-20) in fuse holder on wire, close to solenoid.

Foot Selector Switch—Delco-Remy, 465-S.

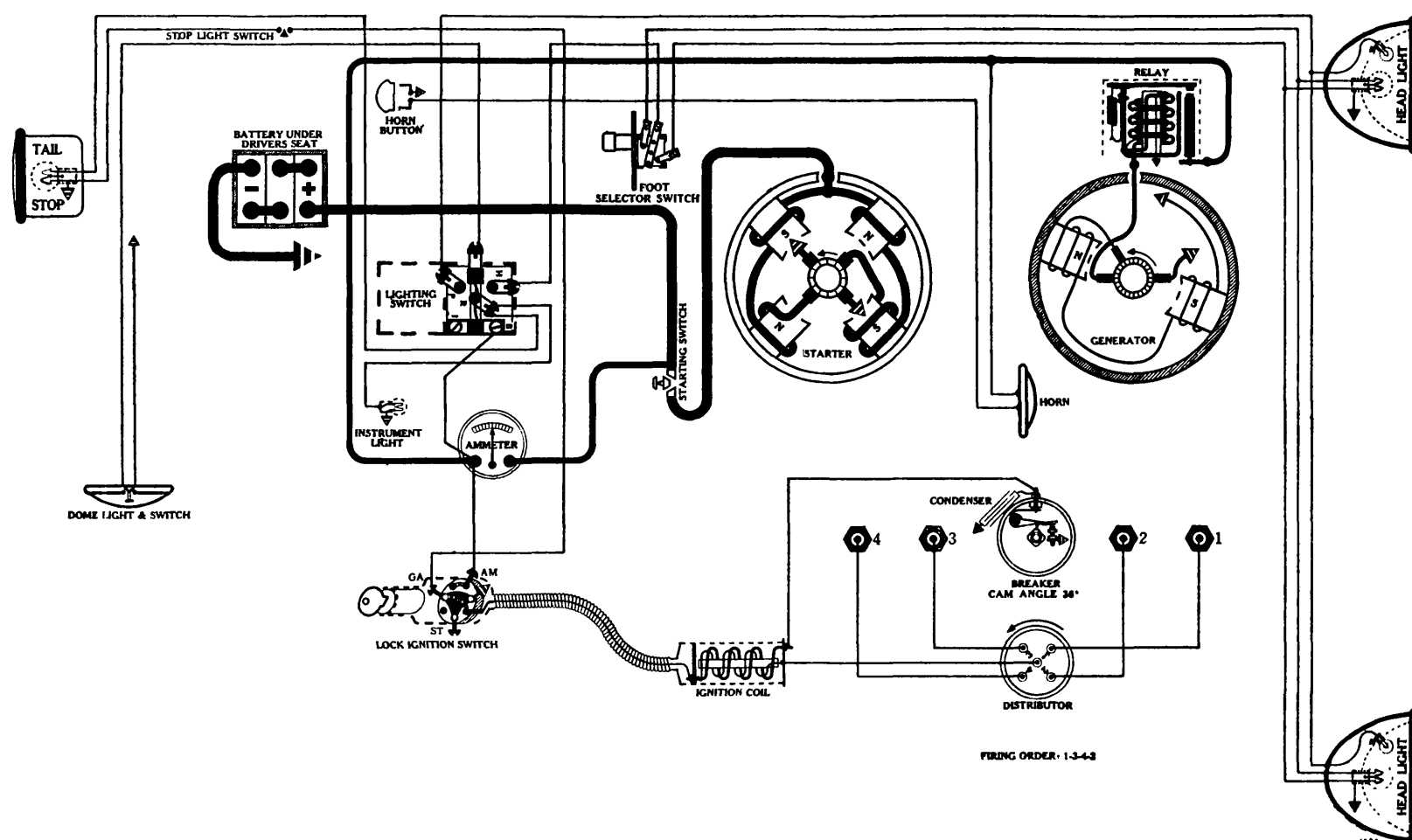
Lamps—See Lamp Table, Sec. AA. HEAD—2320-C*; PARK—63;

INSTRUMENT—63; DOME—87; REAR COMPARTMENT—63;

READING—63; STOP AND TAIL—1158. A new type bulb.

CONTINENTAL

Model 41 "Beacon", 4 cyl., (1934)



BATTERY

U.S.L., A-13-A, 6 volts. Negative Terminal Grounded
 Starting Capacity—96 amps. for 20 minutes.
 Lighting Capacity—3.9 amps. for 20 hours (78 amp. hour).
 Box—Length, 9; width, 7½; height, 8½ inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MZ-4035

Connection to Engine—Bendix Drive, Type LCD-11F-10.
 Running Free—70 amps. at 5½ volts, 4300 R.P.M.
 Cranking Engine—135 to 150 amps. at 4½ volts.
 Lock Torque—7.8 pound-feet, 420 amps. at 3 volts.
 Brush Spring Tension—44 to 56 oz. on each (new brushes).
 Starting Switch—Auto-Lite, SW-4002.
 Armature—Auto-Lite, MZ-2053.

IGNITION

Rotation, L. H., Top View
 Auto-Lite, IGB-4202-A

Breaker—Contact separation .018 inch.
 Cam Angles—Points closed 36 degrees; open 54 degrees.
 Contact Spring Tension—17 to 19 oz.
 Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .017 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
 Spark Plugs—18-MM (AC type G-10); Gap .025 inch.
 Firing Order—1-3-4-2.
 Automatic Advance—14½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
700	350	Start
1000	500	3
1200	600	5
1580	790	9
2100 (Max.)	1050	14½

 Coil and Lock Switch Assembly—Auto-Lite, IG-4606.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAM-4505, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.4	12	1320	7.4
4	880	6.8	16	1860	7.8
8	1060	7.1	17	2400 (Max.)	8.

Motoring Freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—23 amps. at 5.9 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 20 oz. on main; 20 to 24 oz. on third (new brushes).

Armature—Auto-Lite, GAM-2081.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014

Closes—6¼ to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .020 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5670-AA.

Location—Behind instrument board. Operated by pull knob.

Fuses—Single 20 amp. (type 3A-20), mounted on switch.

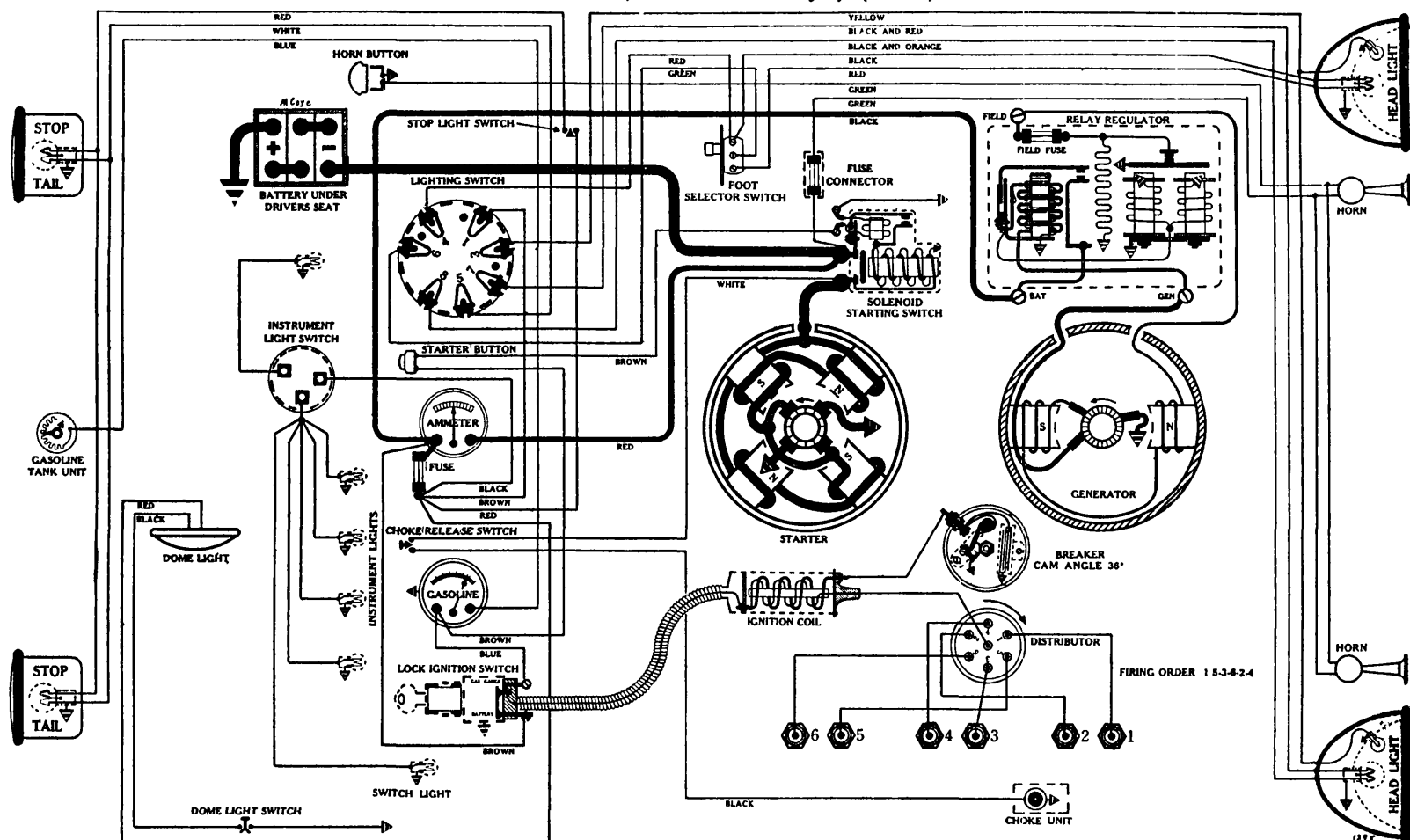
Foot Selector Switch—Soreng-Manegold, No. A2100-A.

Location—On toe board (left side). Tilt beam controlled by pressing foot plunger.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; PARK—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

DE SOTO

Model SE, "Airflow" 6 cyl., (1934)

**BATTERY**

Williard, WS-4-17, 6 volts. Positive Terminal Grounded
 Starting Capacity—140 amps. for 20 minutes.
 Lighting Capacity—5½ amps. for 20 hours (115 amp. hour).
 Box—Length, 11-11/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 727-L

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board working in conjunction with a remote control relay (located in solenoid unit), the control relay being grounded by a short wire connected to frame of starting motor.

Running Free—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—160 to 180 amps. at 4.1 volts.

Lock Torque—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy Solenoid, 1516.

Push Button Starting Control Switch—Delco-Remy, 1387.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
 Delco-Remy, 644-W

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 36 degrees; open 24 degrees.

Contact Spring Tension—17 to 21 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the zero mark on the vibration dampener (which is at exact T.D.C.) has moved three graduations past the pointer on gear case cover. With rotor under No. 1 Dist Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove the ¼ inch pipe plug (located above No. 1 piston) and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12, or remove No. 1 spark plug and attach Gauge, using adapter No. 114 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Continue to turn until piston starts down on power stroke. Stop when .004 inch after T.D.C., as indicated on Gauge.

Spark Plugs—14-MM (AC type SL-9); fixed Gap .025 inch.

NOTE: This is a new type plug with a fixed gap which cannot be changed or adjusted. Use only a piano-wire type of thickness gauge when checking gap. If out of adjustment replace with a new AC plug of same type, which has a threaded length of 7/16 inches.

Firing Order—1-5-3-6-2-4.

Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
380	190	Start
500	250	2
800 (Intermediate)	400	7
2000	1000	11
3200 (Max.)	1600	15

Coil and Lock Switch Assembly—Delco-Remy, 540-E.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 935-D, (Belt Drive)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.2	12	1200	7.5
4	900	7.	16	1600	7.8
8	1050	7.2	20	2600 (Max.)	8.1

Motoring Freely—5½ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 49 volts.

Field Test—2 amps. at 6 volts across field coils in series.

Field Fuse—6 amp. (Type 3A-6) in regulator box.

Brush Spring Tension—22 to 26 oz. on main; 16 to 20 oz. on third (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY—REGULATOR

Delco-Remy, 5542

A combination of Cut-Out Relay and Voltage Operated Two Stage Lock-Out Regulator

Cut-Out Relay: Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

Regulator: Core Gap—.038 inch (armature down).

Contact Opening—.008 to .013 inch (armature down).

Spring Tension—¼ oz. (measured at contact).

Gap between Stop and Fiber Bumper—.028 inch (armature released).

LIGHTING

Switch—DeSoto, No. 614370.

Location—Behind instrument board.

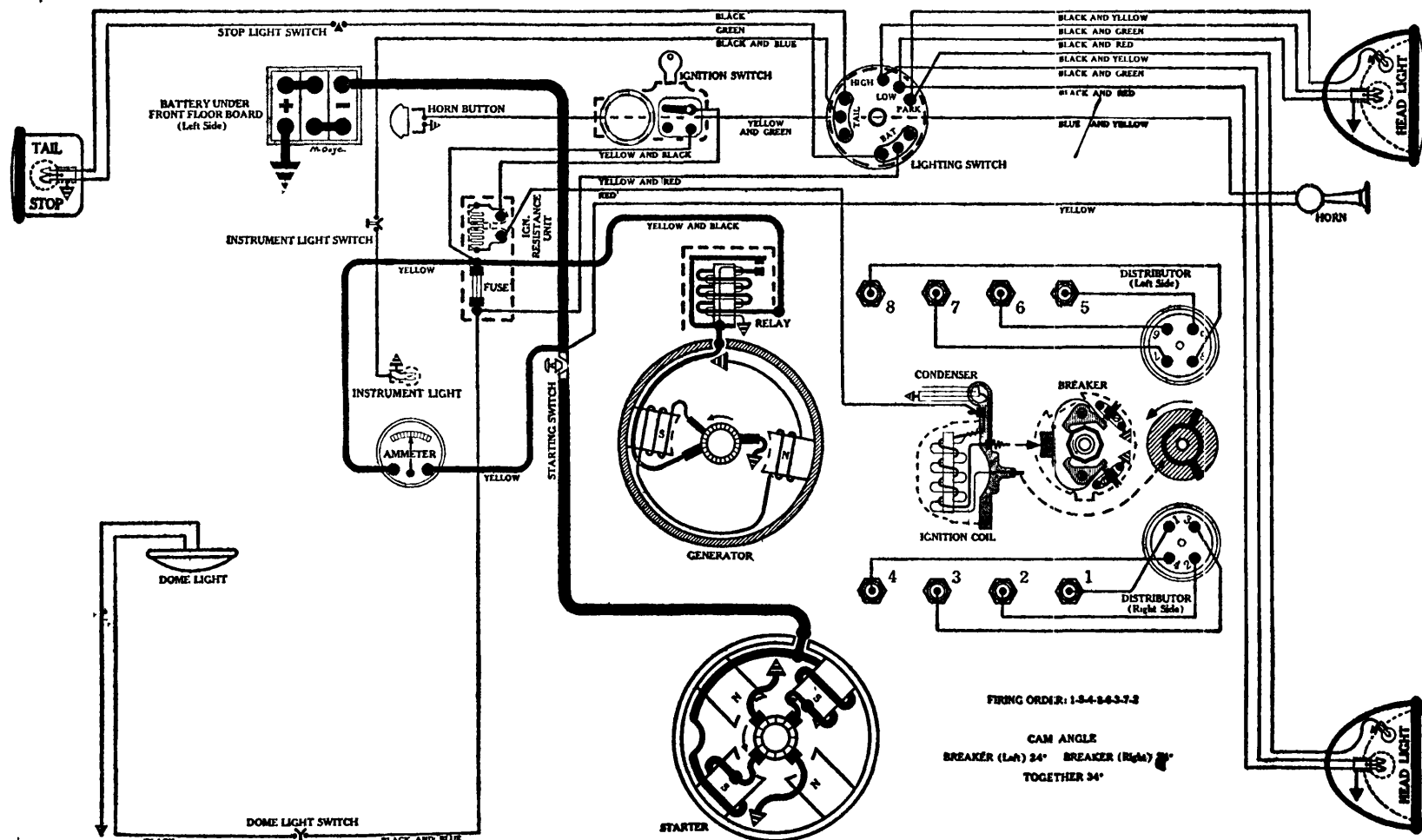
Fuses—(Lighting)—Single 20 amp. fuse (type 3A-20), mounted on back of ammeter. (Horn)—20 amp. (type 3A-20) in fuse holder on wire, close to solenoid.

Foot Selector Switch—Delco-Remy, 465-Z.

Lamps—See Lamp Table, Sec. AA. HEAD—2320-C*; PARK—63; INSTRUMENT—63; DOME—87; STOP AND TAIL—1158. A new type bulb.

FORD

Model 40, 90 degree "Vee" 8, (1934)



BATTERY

Ford, 40-10655-C, 6 volts. Positive Terminal Grounded
Starting Capacity—120 amps. for 20 minutes.
Lighting Capacity—4.8 amps. for 20 hours (96 amp. hour).
Box—Length, 10-9/16; width, 7 1/4; height, 7 1/8 inches.

STARTER

Rotation, L. H., Com. End
Ford, Type 40-11002

Connection to Engine—Bendix Drive, Type L11FX-10.
Running Free—35 to 40 amps. at 6 volts, 3960 R.P.M.
Cranking Engine—210 to 225 amps. at 4.3 volts.
Lock Torque—12 pound-feet, 500 amps. at 3 volts.
Brush Spring Tension—32 to 36 oz. on each (new brushes).
Starting Switch—Ford, 18-11450.
Armature—Ford, 18-11005.

IGNITION

Rotation, L. H., Viewed from Front
Special Ford, employing Mallory Breaker Principle
Full Automatic Spark Advance in conjunction with Vacuum Operated Governor Brake

Breakers—Contact separation .012 to .014 inch.
Cam Angles—Points closed 24 degrees; open 21 degrees (left breaker). Points closed 24 degrees; open 21 degrees (right breaker). Points closed 34 degrees; open 11 degrees (both together).
Contact Spring Tension—22 to 24 oz. on each.
Timing—Construction of ignition drive assembly makes it impossible to attach unit to engine other than in correct position. Provision is made for a slight variation in spark timing by moving small 3/16 inch slotted cap screw (found on right side of ignition housing between mounting flange and right distributor cap) up, to increase spark advance, and down to retard. With screw in center of slot engine will have a spark advance of 4 fly-wheel degrees which, theoretically, is the correct timing position.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 40. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .006 inch before T. D.C., as indicated on Gauge. With rotor segment under No. 1 Dist. Cap Terminal (right side), right hand breaker point should just open.
Spark Plugs—18-MM (Champion type 7); Gap .025 inch.
Firing Order—1-5-4-8-6-3-7-2.

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
(Tests to be made with Governor free—Vacuum Brake Released)		
400	200	2
650	325	4
1180	590	6
2100	1050	8
3000 (Max.)	1500	10

Ignition Switch—Ford Coincidental (Combination Ignition Switch and Steering Post Lock).

GENERATOR

Rotation, L. H., Com. End
Ford, Type 40-10000 (as shown), or Type 40-10000-B, "Air-Cooled" with Regulator (For data see "1934 Ford Generators", Sec. AA)
Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.7	9	1100	7.5
3	800	6.9	10	1200	7.6
5	900	7.3	11	1500 (Max.)	7.9
7	1000	7.4	10 1/2	1700	7.9

Motoring Freely—6 amps. at 6 volts.

Max. Stall Current—25 amps. at 5 volts.

Field Test—5 1/4 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on main; 20 to 24 oz. on third.

Armature—Ford, 18-10005-A.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAYS

Ford, Type 10505 (as shown)
Ford, Type 40-10505, Two Stage Voltage Operated Regulator.
(For data see Sec. AA)

Closes—6 1/2 to 7 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .020 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Ford, Type B-11673.

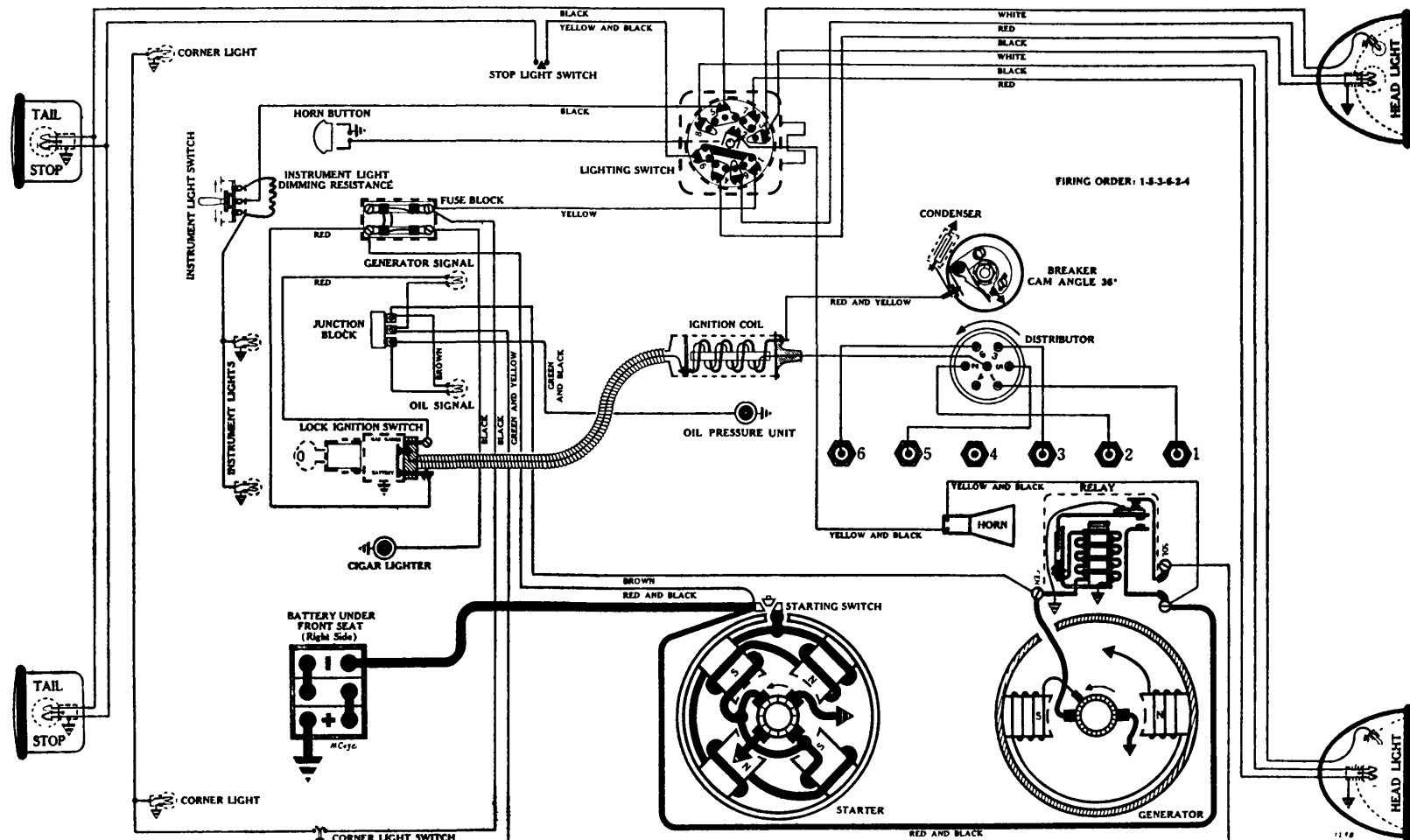
Location—Foot of steering column. Lights controlled by lever on steering wheel. Wires soldered to terminals.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on dash, behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1000; PARK—63; INSTRUMENT—81; DOME—63; STOP AND TAIL—1158.

GRAHAM

Model 68, Standard and DeLuxe, 6 cyl., (1934)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—105 amps. for 20 minutes.
Lighting Capacity—4.3 amps. for 20 hours (86 amp. hour).
Box—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
 Delco-Remy, 738-D

NOTE: Delco-Remy, 734 U Starting Motors with Solenoid Starting Switch used on early 1934 six cylinder cars. For data and circuit diagram see Graham Model 67, 1934.

Connection to Engine—Mechanical pinion shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—170 to 185 amps. at 4.3 volts.
Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each (new brushes).
Starting Switch—Delco-Remy, 820052.
Armature—Delco-Remy, 823881.

IGNITION

Rotation, L. H., Top View
 Delco-Remy, 632-Z

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 36 degrees; open 24 degrees.
Contact Spring Tension—17 to 21 oz.
Timing—With No. 1 piston on compression stroke bring flywheel mark "SA-1" (which mark is 3 degrees or 5/16 inch on flywheel before T.D.C.) directly under pointer in flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 102 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .006 inch before T.D.C., as indicated on Gauge.
Spark Plugs—3/8 inch (Champion type C-4X); Gap .025 inch.
Firing Order—1-5-3-6-2-4.

Automatic Advance—10½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
720	360	Start
1600	800	3
2200	1100	5
3440	1720	9
3900 (Max.)	1950	10½

Coil and Lock Switch Assembly—Delco-Remy, 536-L (Standard); 536-M (DeLuxe).

GENERATOR

Rotation, L. H., Com. End
 Delco-Remy, 935-E, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
2	700	6.4	10	1000	7.1
5	800	6.6	15	1400	7.5
8	900	6.9	19	2400 (Max.)	8.

Motoring Freely—4 amps. at 6 volts.
Max. Stall Current—22 amps. at 6 volts.
Field Test—2.3 amps. at 6 volts across field coils in series.
Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).
Armature—Delco-Remy, 1854856.
Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-S

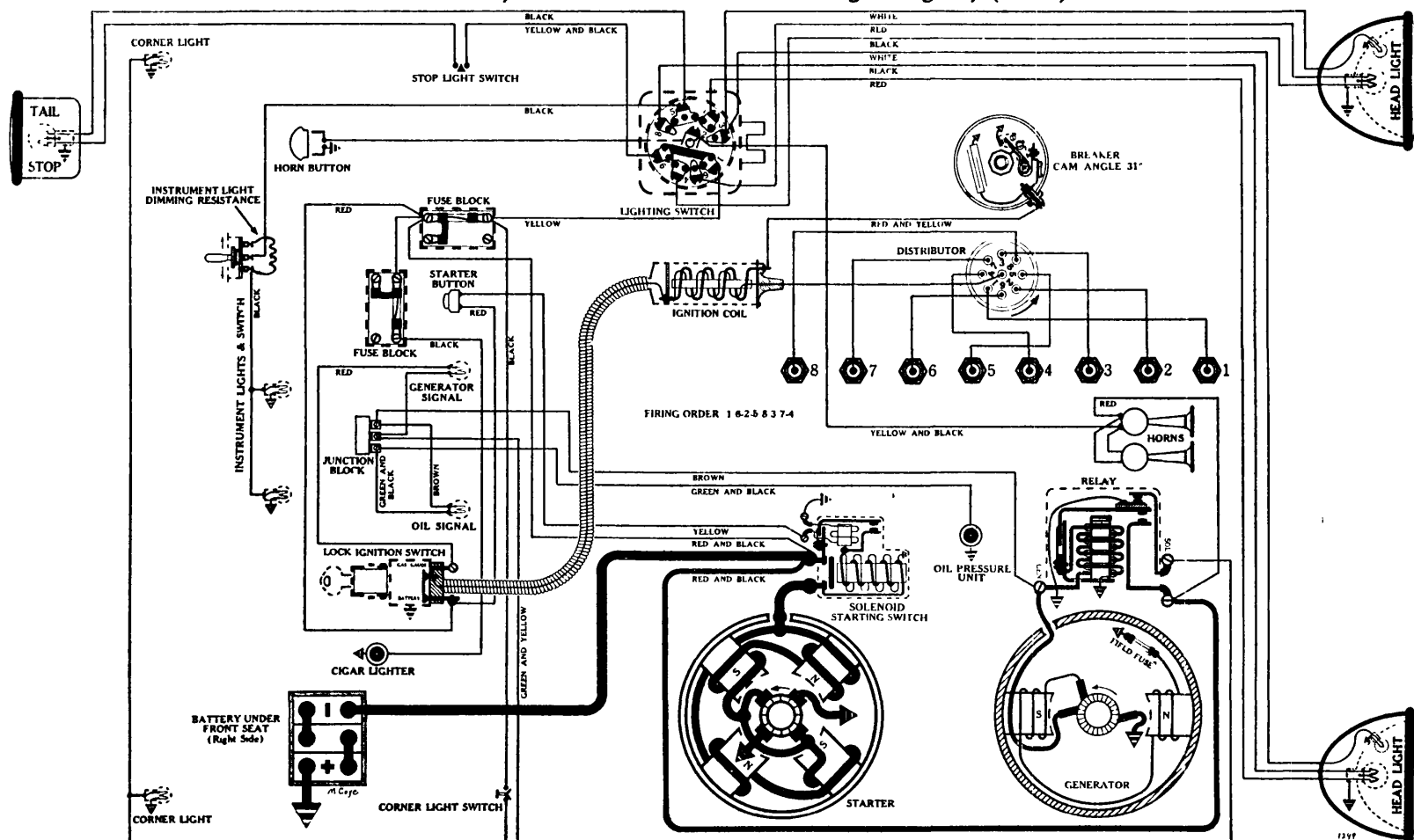
NOTE: This is a new type unit with an extra terminal which is grounded through an auxiliary set of points when the cut-out points are open.
Closes—7 to 7½ volts.
Opens—0 to 2½ amps. discharge.
Contact Gap—.015 to .025 inch.
Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9463.
Location—Foot of steering column.
Fuses—Two 20 amp. fuses (type 3A-20) in fuse block on dash (driver's side).
Lamps—See Lamp Table, Sec. AA. HEAD—2320-C*; PARK—63; INSTRUMENT—63; SIGNALS—64; CORNER—63; STOP AND TAIL—1158. *A new type bulb.

GRAHAM

Model 67, Standard and DeLuxe Straight Eights, (1934)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—122 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours (100 amp hour).
Box—Length, 10-5/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 734-U

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board working in conjunction with a remote control relay (located in solenoid unit), the control relay being grounded by a short wire connected to frame of starting motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—175 to 190 amps. at 4.1 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy Solenoid, 1517.

Push Button Starting Switch—Delco-Remy, 1388 (Standard); 1386 (DeLuxe).

Armature—Delco-Remy, 823881.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 661-X

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-N Vacuum Advance)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—With No. 1 piston on compression stroke, bring flywheel mark "SA-1" (found 3 degrees or 5/16 inch ahead of flywheel mark "T.D.C.") opposite pointer on flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 102 and rod No. 40. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .003 inch before T.D.C., as indicated on Gauge.

Spark Plugs— $\frac{3}{8}$ inch (Champion type C-4X); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance—5 degrees (Distributor).

Automatic Advance—8 $\frac{1}{2}$ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
1000	500	1
1800	900	3
3060	1530	6
4100 (Max.)	2050	8 $\frac{1}{2}$

Coil and Lock Switch Assembly—Delco-Remy, 536-L (Standard); 536-M (DeLuxe).

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 967-M, (Rubber Hose Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	11	1200	7.9
3	825	6.8	15	1400	8.
5	1000	7.3	18	2000 (Max.)	8.2

Motoring Freely—2 $\frac{1}{2}$ to 3 amps. at 6 volts.

Max Stall Current—21 to 24 amps. at 6 volts.

Field Test—3 $\frac{1}{2}$ amps. at 6 volts across field coils in series.

Field Fuse—7 amps. (Type 7A-6).

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Armature—Delco-Remy, 1844827.

Third Brush Adjustment—loosen, cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAYS

Cut-Out Relay, Delco-Remy, 265-S

NOTE: This is a new type unit with an extra terminal which is grounded through an auxiliary set of points when the cut out points are open.

Closes—7 to 7 $\frac{1}{2}$ volts.

Opens—0 to 2 $\frac{1}{2}$ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

Solenoid Relay, (located in Solenoid Unit)

Closes—3.6 to 4 volts (max.).

Opens—1.6 to 2 volts.

Contact Gap—.030 to .045 inch.

Core Gap—.010 to .014 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9463.

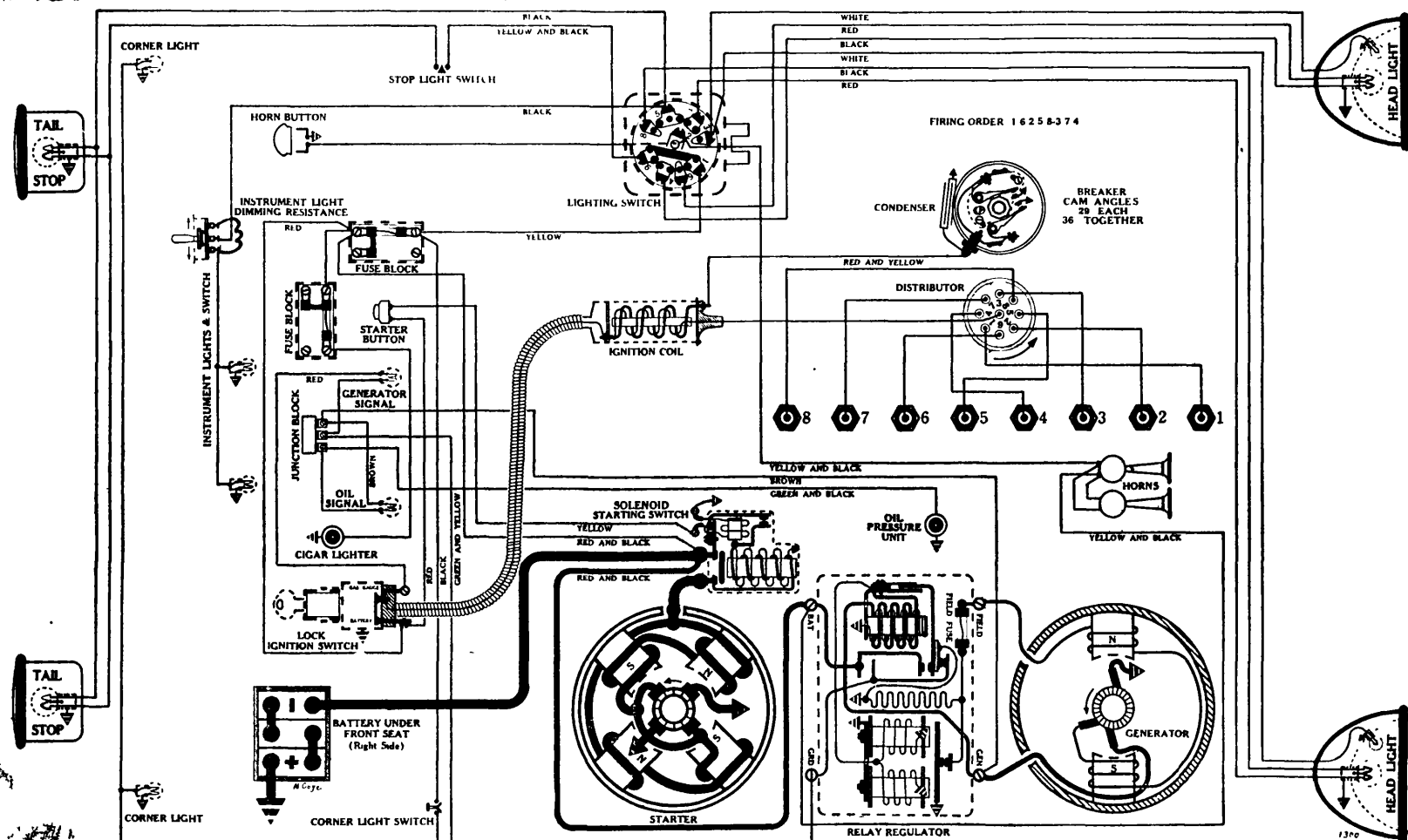
Location—Foot of steering column.

Fuses—Two 20 amp. fuses (type 3A-20) in fuse block on dash (driver's side).

Lamps—See Lamp Table, Sec. AA. HEAD—2320-C*; PARK—63; INSTRUMENT—63; SIGNALS—64; CORNER—63; STOP AND TAIL—1158. *A new type bulb.

GRAHAM

Model 69, "Sup r-Charged" Straight Eight, (1934)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—122 amps. for 20 minutes.
Lighting Capacity—5 amps. for 20 hours (100 amp hour).
Box—Length, 10-5/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 734-U

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board working in conjunction with a remote control relay (located in solenoid unit), the control relay being grounded by a short wire connected to frame of starting motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—175 to 190 amps. at 4.1 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy Solenoid, 1517.

Push Button Starting Switch—Delco-Remy, 1388 (Standard); 1386 (DeLuxe).

Armature—Delco-Remy, 823881.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 661-Y

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-N Vacuum Advance)

IMPORTANT NOTE! The 661-Y distributor employs an eight point cam with two sets of breaker points, which are connected in parallel, and control a single coil. While it is possible to adjust the two breakers to operate simultaneously, it is recommended that they be thrown out of synchronism, with the movable points adjusted to operate from 8 to 10 degrees before the stationary. Engine timing is done from the stationary points, which open last. With this adjustment the period of coil saturation is increased from 29 degrees to 36 degrees.

Breakers—Contact separation .015 on each.

Cam Angles—Points closed 29 degrees; open 16 degrees (each breaker).

Points closed 36 degrees; open 9 degrees (both together).

Contact Spring Tension—19 to 23 oz. on each.

Timing—With No. 1 piston on compression stroke, bring flywheel mark "SA-1" (found 6 degrees or 1/2 inch ahead of flywheel mark "T.D.C.") opposite pointer on flywheel housing. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 40. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .015 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—18-MM (Champion type 7); Gap. 025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance—5 degrees (Distributor).

Automatic Advance—7 1/4 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
200	100		2
880	440		5 1/4
2000 (Intermediate)	1000		6
2600	1300		7 1/4
4000 (Max.)	2000		

Coil and Lock Switch Assembly—Delco-Remy, 539-F.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 967-L (Rubber Hose Drive)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	735	6.2	11	1200	7.2
3	800	6.4	15	1400	7.7
5	1000	6.7	20	2100	8.8

Motoring Freely—4 1/2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 4.9 volts.

Field Test—3 1/2 amps. at 6 volts across field coils in series.

Field Fuse—6 amp. (Type 3A-6) in regulator box.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Armature—Delco-Remy, 1855966.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third

Brush Adjustment" page, Sec. AA.

RELAY-REGULATOR

Delco-Remy, 5544

A combination of Cut-Out Relay and Voltage Operated Two Stage Lock-Out Regulator

Cut-Out Relay: Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

Regulator: Core Gap—.038 inch (armature down).

Contact Opening—.008 to .013 inch (armature down).

Spring Tension—3/4 oz. (measured at contact).

Gap between Stop and Fiber Bumper—.028 inch (armature released).

LIGHTING

Switch—Clum, No. 9463.

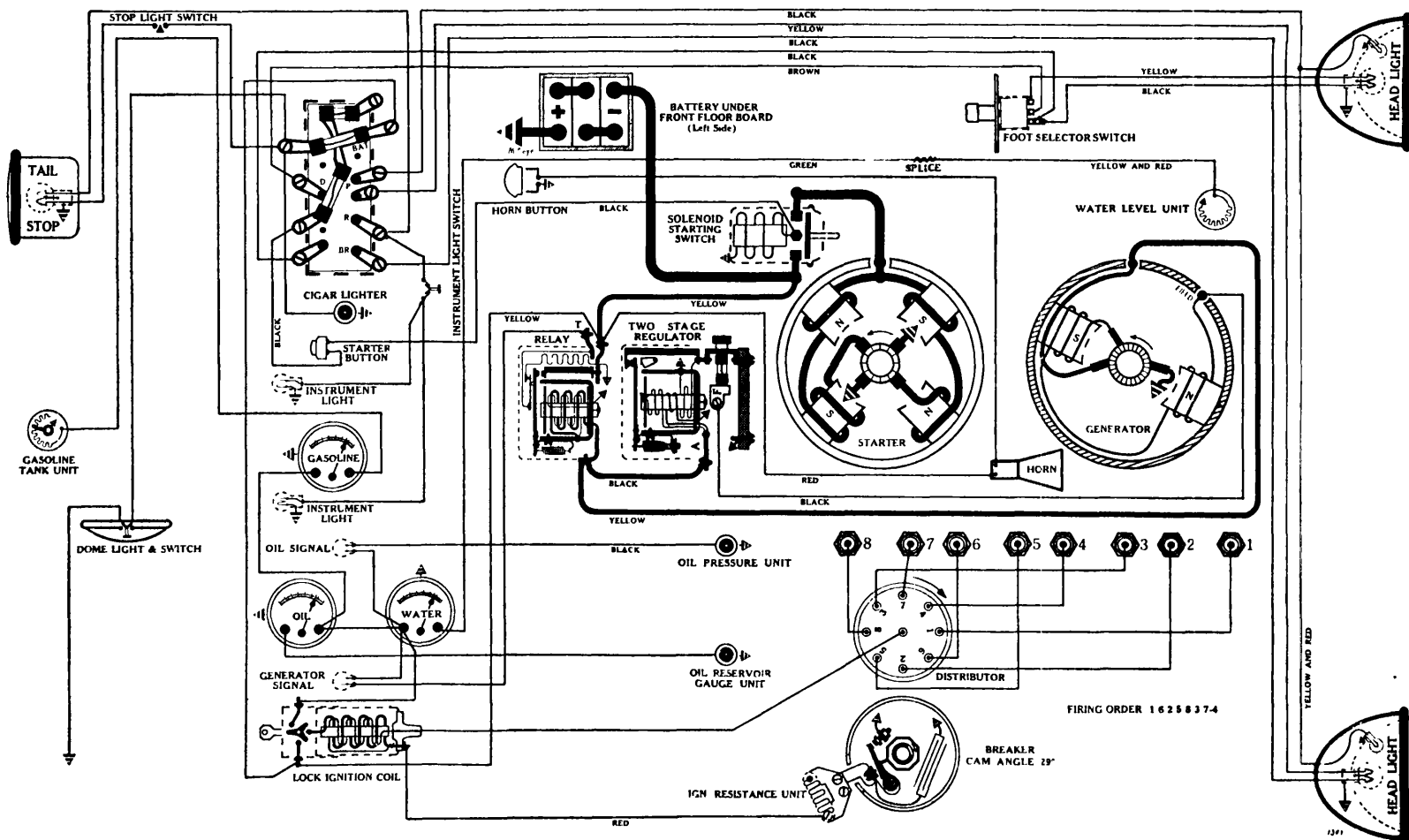
Location—Foot of steering column.

Fuses—Two 20 amp. fuses (type 3A-20) in fuse block on dash (driver's side).

Lamps—See Lamp Table, Sec. AA. HEAD—2320-C; PARK—63; INSTRUMENT—63; SIGNALS—64; CORNER—63; STOP AND TAIL—1158. *A new type bulb.

HUDSON

Models LL, LT, LLU and LW, Straight Eights, (1934)



BATTERY

Exide, XTL-19-17F, 6 volts. Positive Terminal Grounded
 Starting Capacity—106 amps. for 20 minutes.
 Lighting Capacity—6.5 amps. for 20 hours (130 amp. hour).
 Box—Length, 11-13/16; width, 7-5/16; height, 7-11/16 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAB-4061

Connection to Engine—Bendix Drive, Type A-1673. For details of operation and instructions on assembling refer to Section AA.
 Running Free—60 amps. at 5½ volts, 3700 R.P.M.
 Cranking Engine—275 to 300 amps. at 4.3 volts.
 Lock Torque—15½ pound-feet, 582 amps. at 3 volts.
 Brush Spring Tension—44 to 56 oz. on each (new brushes).
 Starting Switch—Auto-Lite Solenoid, SS-4001.
 Push Button Starting Control Switch—Soreng-Manegold, 5550-A.
 Armature—Auto-Lite, MAB-2113.

IGNITION

Rotation, R. H., Top View
 Auto-Lite, IGP-4001-A

(Full Automatic Spark Advance)

Breaker—Contact separation .015 inch.
 Cam Angles—Points closed 29 degrees; open 16 degrees.
 Contact Spring Tension—18 to 20 oz.
 Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "U.D.C. 1-8" is directly in line with pointer on timing inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
 Timing with MOTOR GAUGE—Remove No. 8 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 44. Stop when piston reaches exact T.D.C., as indicated on Gauge.
 Spark Plugs—14-MM (Champion type J-7); Gap .022 inch.
 Firing Order—1-6-2-5-8-3-7-4.
 Automatic Advance—17½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
800	400		6
1900	950		12
3000	1500		17
3900	1950		17½
4000 (Max.)	2000		

 Lock Ignition Coil—Auto-Lite, CE-4304.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBK-4602, (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	775	6.2	10	1175	7.1
2	850	6.3	12	1280	7.3
4	925	6.5	16	1450	7.6
6	975	6.7	18	1850	7.8
8	1085	7.	22	2400 (Max.)	8.3

Motoring Freely—5 amps. at 6 volts.

Max. Stall Current—25 to 28 amps. at 5½ volts.

Field Test—3.9 amps. at 6 volts across field coils in series.

Field Fuse—7½ amp. (Type 1A-7½) in regulator unit.

Brush Spring Tension—18 to 22 oz. on each (new brushes).

Armature—Auto-Lite, GBK-2055.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAYS

Cut-Out Relay, Auto-Lite, CBA-4002

Closes—6¾ to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .020 inch, contacts closed.

Voltage Operated Regulator, Auto-Lite, TC-4102-A

Points Open—8.2 to 8.6 volts.

Points Close—6.8 to 7.3 volts.

Contact Opening—.009 to .012 inch.

Core Gap—.030 to .040 inch, contacts closed.

LIGHTING

Switches—Soreng-Manegold, No. 5640-A, with electric windshield wiper fuse (as shown). After April 1, 1934 vacuum wipers used, and new lighting switch No. C-5640-A. (For connections see Terraplane Challenger 1934).

Location—Behind instrument board.

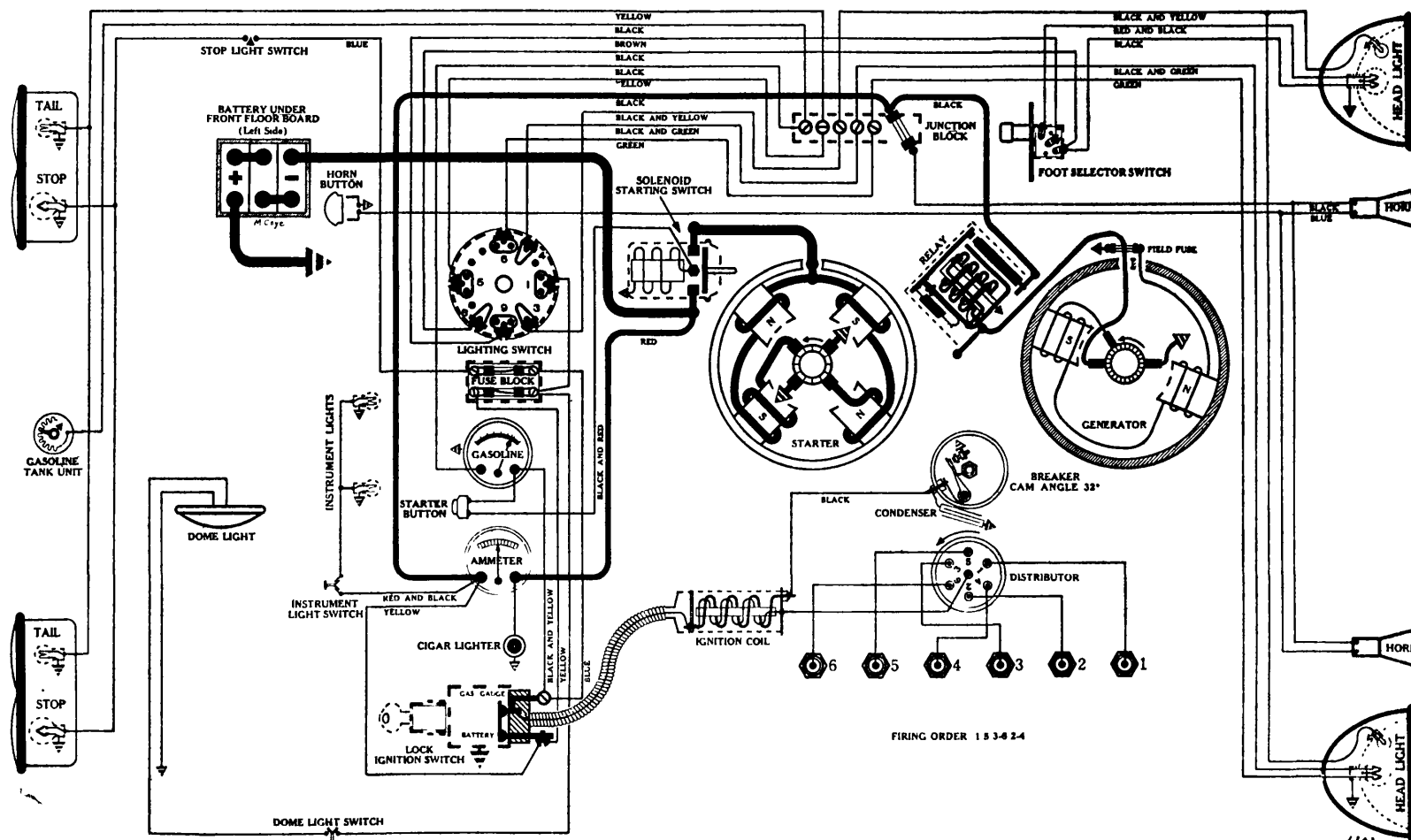
Fuses—Two 20 amp. fuses (type 3A-20), and one 7½ amp. fuse (type 1A-7½) mounted on lighting switch.

Foot Selector Switch—Hudson, No. 45978.

Lamps—See Lamp Table, Sec. AA. HEAD—2320-C*; PARK—63; INSTRUMENT—63; SIGNALS—64; DOME—87; VESTIBULE—87; STOP AND TAIL—1158. A new type bulb.

HUPMOBILE

Mod 1 W, Series 417, 6 cyl., (1934)



BATTERY

Willard, WMB-17, 6 volts. Positive Terminal Grounded

Starting Capacity—115 amps. for 20 minutes.
Lighting Capacity—4½ amps. for 20 hours (90 amp. hour).
Box—Length, 10-9/16; width, 7¾; height, 7-13/16 inches.

STARTER

Rotation. L. H., Com. End

Auto-Lite, MAB-4065

Connection to Engine—Bendix Drive, Type LCD11FX-10.
Running Free—60 amps. at 5½ volts, 3700 R.P.M.
Cranking Engine—275 to 300 amps. at 4.3 volts.
Lock Torque—15½ pound-feet, 582 amps. at 3 volts.
Brush Spring Tension—44 to 56 oz. on each (new brushes).
Starting Switch—Auto-Lite Solenoid, SS-4001.
Armature—Auto-Lite, MAB-2047.

IGNITION

Rotation, L. H., Top View

Auto-Lite, IGB-4319

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 32 degrees; open 28 degrees
Contact Spring Tension—17 to 19 oz.
Timing—With No. 1 piston on compression stroke, slowly turn engine until flywheel mark "Ign. Adv." (found 7 degrees ahead of mark "DC 1-6") is in line with finished bosses on front face of clutch housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 6 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 5. Slowly turn engine until No. 6 piston is coming up on compression stroke. Stop when piston is .016 inch before T.D.C., as indicated on Gauge.
Spark Plugs—18-MM (Champion type C-7); Gap .026 to .030 inch.
Firing Order—1-5-3-6-2-4.

Automatic Advance—7 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
800	400	Start
1100	550	1
1660	830	3
2230	1115	5
2800 (Max.)	1400	7

Coil and Lock Switch Assembly—Auto-Lite, IG-4608.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBK-4603, (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	760	6.2	10	1150	7.1
2	850	6.3	12	1250	7.3
4	925	6.5	14	1400	7.6
6	970	6.7	16	1600	7.8
8	1100	7.	18	1800 (Max.)	8.

Motoring Freely—5½ amps at 6 volts.

Max. Stall Current—23 to 25 amps. at 5½ volts.

Field Test—4 amps. at 6 volts, across field coils in series.

Field Fuse—7½ amps. (Type 1A-7½).

Brush Spring Tension—24 to 36 oz. on each (new brushes).

Armature—Auto-Lite, GBK-2055.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite. CB-4021

Closes—6¾ to 7½ volts.

Opens— $\frac{1}{2}$ to $2\frac{1}{2}$ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .020 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9526.

Location—Behind instrument board.

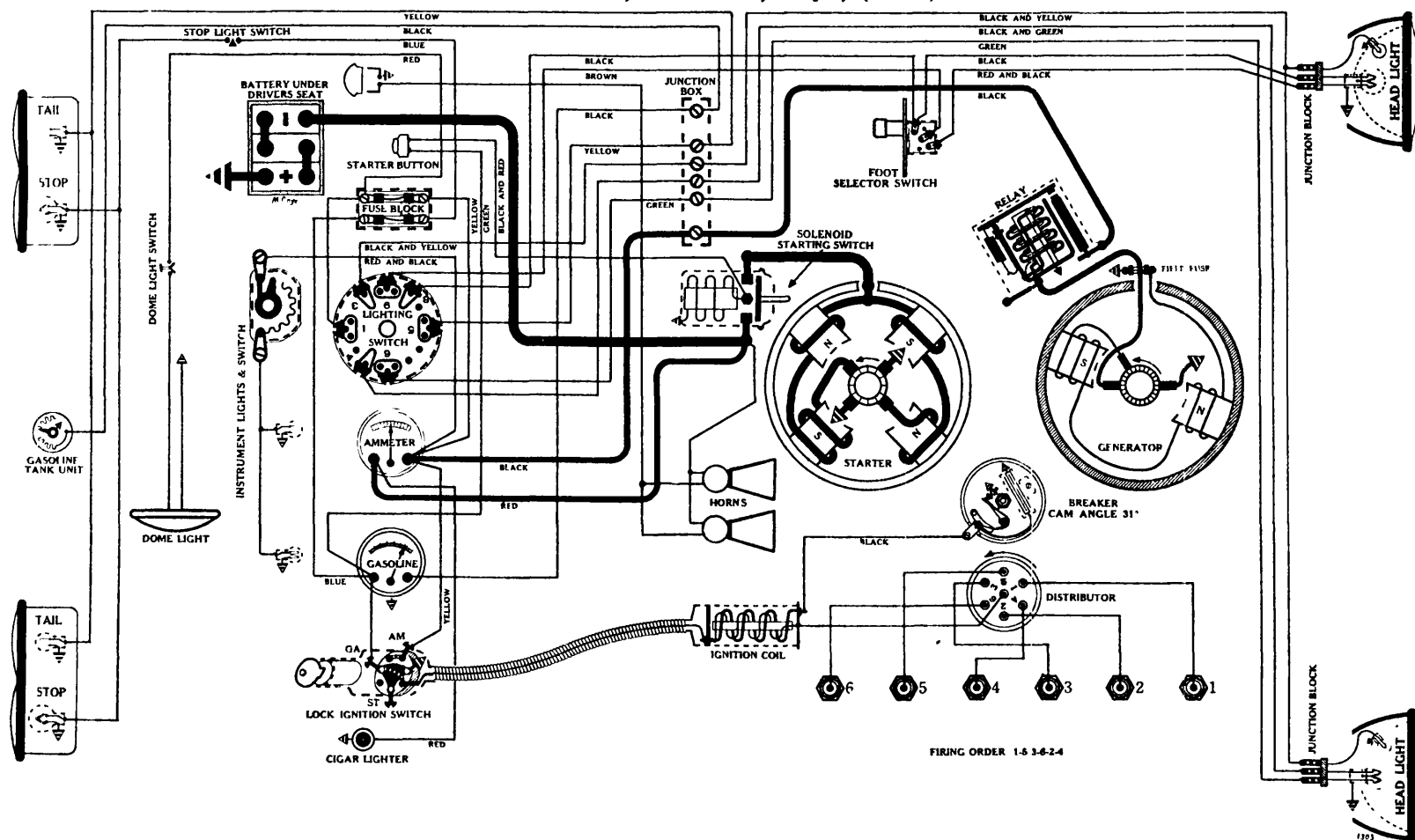
Fuses—Two 20 amp. fuses (type 3A-20) in fuse block on dash.
Single 20 amp. fuse (type 3A-20) for horn circuit on junction block, foot of steering column.

Foot Selector Switch—Clum, No. 9505.

Lamps—See Lamp Table, Sec. AA. **HEAD**—2320-C*; **PARK**—63;
INSTRUMENT—63; **DOME**—81; **STOP**—87; **TAIL**—63. *A
new type bulb.

HUPMOBILE

Mod 1 J, Series 421, 6 cyl., (1934)



BATTERY

Willard, WST-2-17, 6 volts. Positive Terminal Grounded
 Starting Capacity—134 amps. for 20 minutes.
 Lighting Capacity—5.6 amps. for 20 hours (112 amp. hour).
 Box—Length, 10-5/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAB-4065

Connection to Engine—Bendix Drive, Type LCD11FX-10.
 Running Free—60 amps. at 5½ volts, 3700 R.P.M.
 Cranking Engine—275 to 300 amps. at 4.3 volts.
 Lock Torque—15½ pound-feet, 582 amps. at 3 volts.
 Brush Spring Tension—44 to 56 oz. on each (new brushes).
 Starting Switch—Auto-Lite Solenoid, SS-4001.
 Armature—Auto-Lite, MAB-2047.

IGNITION

Rotation, L. H., Top View
 Auto-Lite, IGC-4058

(Full Automatic Spark Advance)

Breaker—Contact separation .018 inch.
 Cam Angles—Points closed 31 degrees; open 29 degrees.
 Contact Spring Tension—17 to 19 oz.
 Timing—With No. 1 piston on compression stroke, slowly turn engine until flywheel mark "Ign. Adv." (found 7 degrees ahead of mark "DC 1-6") is in line with finished bosses on front face of clutch housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
 Timing with MOTOR GAUGE—Remove No. 6 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 6 piston is coming up on compression stroke. Stop when piston is .018 inch before T.D.C. as indicated on Gauge.
 Spark Plugs—18-MM (Champion type C-7); Gap .026 to .030 inch.
 Firing Order—1-5-3-6-2-4.
 Automatic Advance—7 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
800	400		1
1100	550		3
1660	830		5
2230	1115		7
2800 (Max.)	1400		

 Coil and Lock Switch Assembly—Auto-Lite, CE-4602.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GBK-4503, (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	760	6.2	10	1150	7.1
2	850	6.3	12	1250	7.3
4	925	6.5	14	1400	7.6
6	970	6.7	16	1600	7.8
8	1100	7.	18	1800 (Max.)	8.

Motoring Freely—5½ amps at 6 volts.

Max. Stall Current—23 to 25 amps. at 5½ volts.

Field Test—4 amps. at 6 volts, across field coils in series.

Field Fuse—7½ amps. (Type 1A-7½).

Brush Spring Tension—24 to 36 oz. on each (new brushes).

Armature—Auto-Lite, GBK-2055.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

Closes—6¾ to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .020 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9526.

Location—Behind instrument board.

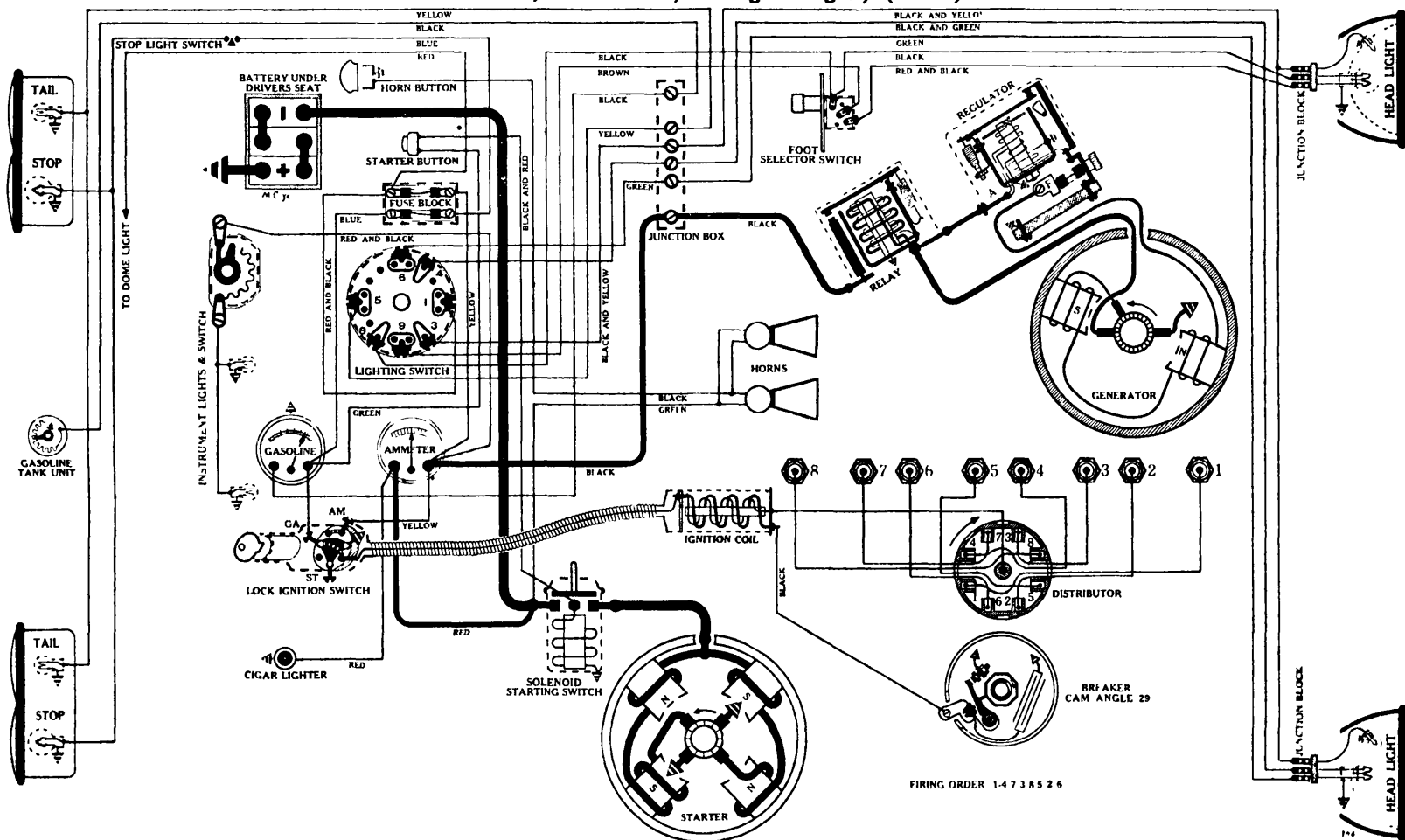
Fuses—Two 20 amp. fuses (type 3A-20) in fuse block on dash. Single 20 amp. fuse (type 3A-20) for horn circuit on junction block, foot of steering column.

Foot Selector Switch—Clum, No. 9505.

Lamps—See Lamp Table, Sec. AA. HEAD—2320-C*; PARK—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63. *A new type bulb.

HUPMOBILE

Model T, Series 427, Straight Eight, (1934)



BATTERY

Willard, WH-2-15, 6 volts. Positive Terminal Grounded

Starting Capacity—119 amps. for 20 minutes.
Lighting Capacity—5.9 amps. for 20 hours (118 amp. hour).
Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4066

Connection to Engine—Bendix Drive, Type RCD10FXD-9.
Running Free—60 amps. at 5½ volts, 3700 R.P.M.
Cranking Engine—275 to 300 amps. at 4.3 volts.
Lock Torque—15½ pound-feet, 582 amps. at 3 volts.
Brush Spring Tension—44 to 56 oz. on each (new brushes).
Starting Switch—Auto-Lite Solenoid, SS-4002.
Armature—Auto-Lite, MAB-2046.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGP-4003

(Full Automatic Spark Advance)

Breaker—Contact separation .015 inch.
Cam Angles—Points closed 29 degrees; open 16 degrees.
Contact Spring Tension—18 to 20 oz.
Timing—With No. 1 piston on compression stroke, bring flywheel mark (found 15/16 inches, or 9 degrees, ahead of "1-8-DC"), so that it will register with center line of flywheel housing peep hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .021 inch before T.D.C., as indicated on Gauge.
Spark Plugs—18-MM (Champion type C-7); Gap .026 to .030 inch.
Firing Order—1-4-7-3-8-5-2-6.
Automatic Advance—6½ degrees (Distributor).
Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist.)
800 400 Start
1530 765 2
2270 1135 4
3000 1500 6
3200 (Max.) 1600 6½
Coil and Lock Switch Assembly—Auto-Lite, CE-4602.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4606, (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	760	6.2	10	1150	7.1
2	850	6.3	12	1250	7.3
4	925	6.5	14	1400	7.6
6	970	6.7	16	1600	7.8
8	1100	7.	18	1800 (Max.)	8.

Running Free—5½ amps. at 6 volts.
Max. Stall Current—24 to 26 amps. at 5½ volts.
Field Test—4 amps. at 6 volts, across field coils in series.
Field Fuse—7½ amps. (Type 1A-7½).
Brush Spring Tension—24 to 36 oz. on each (new brushes).
Armature—Auto-Lite, GAR-2089.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAYS

Cut-Out Relay, Auto-Lite, CB-4021

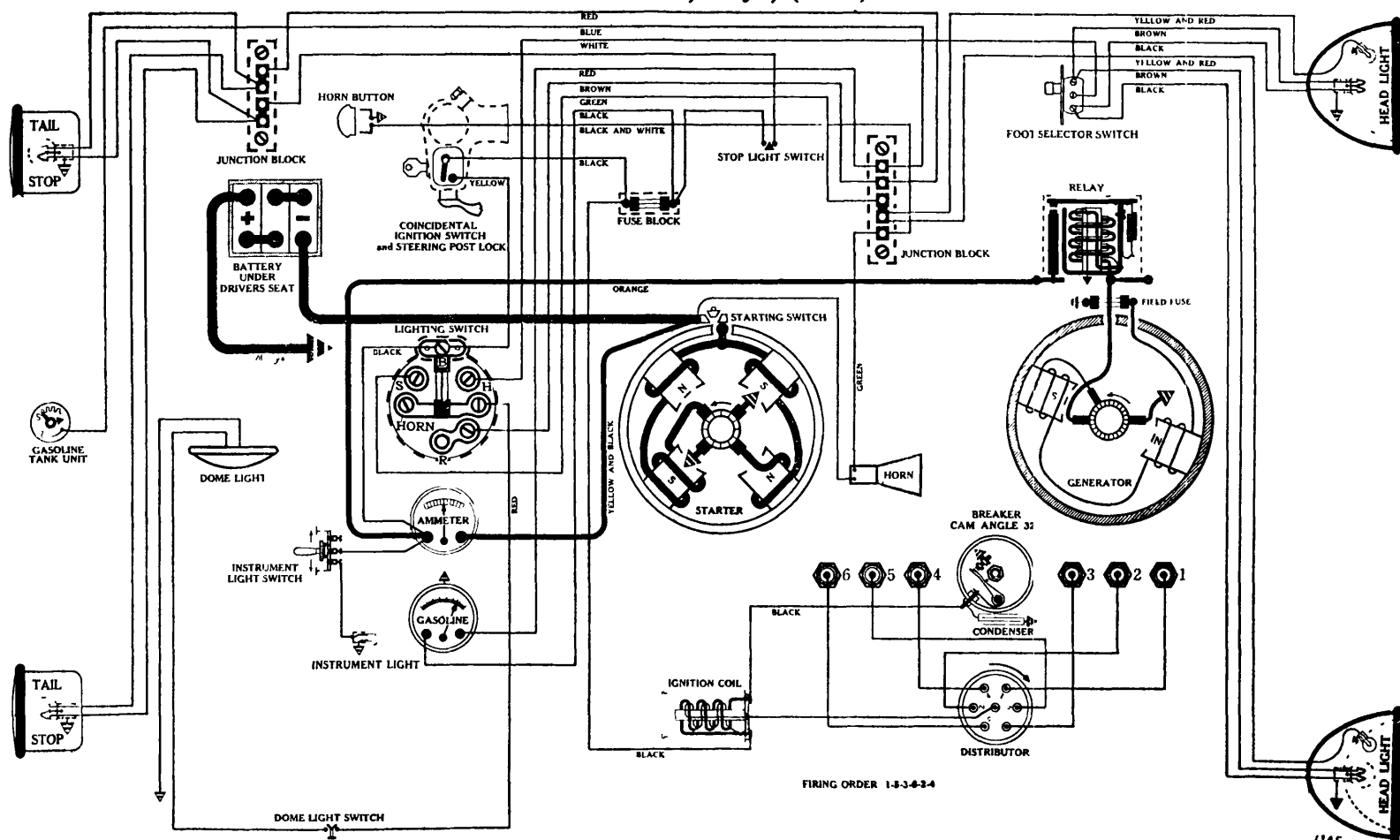
Closes—6¾ to 7½ volts.
Opens—½ to 2½ amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .020 inch, contacts closed.
Voltage Operated Regulator, Auto-Lite, TC-4101-A
Points Open—8.2 to 8.6 volts.
Points Close—6.8 to 7.3 volts.
Contact Opening—.009 to .012 inch.
Core Gap—.030 to .040 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9526.
Location—Behind instrument board.
Fuses—Two 20 amp. fuses (type 3A-20) in fuse block on dash.
Single 20 amp. fuse (type 3A-20) for horn circuit on junction block, foot of steering column.
Foot Selector Switch—Clum, No. 9505.
Lamps—See Lamp Table, Sec. AA. HEAD—2320-C*; PARK—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63. *A new type bulb.

LAFAYETTE

Model 110, 6 cyl., (1934)

**BATTERY**

Globe No. 71, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Lighting Capacity—5.1 amps. for 20 hours (102 amp. hour).

Box—Length, 9-1/16; width, 7-1/8; height, 8-5/16 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite, MAB-4062

Connection to Engine—Bendix Drive, Type LCD11FX-10.

Running Free—60 amps. at 5½ volts, 3700 R.P.M.

Cranking Engine—160 to 170 amps. at 4.2 volts.

Lock Torque—15½ pound-feet, 582 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (new brushes).

Starting Switch—Auto-Lite, MAB-2079-AS, mounted on starter.

Switch should not close with less than 2.3 lbs. pull applied at right angles to hole in extreme end of lever.

Armature—Auto-Lite, MAB-2057.

IGNITION

Rotation, R. H., Top View

Auto-Lite, IGB-4317

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 32 degrees; open 28 degrees.

Contact Spring Tension—17 to 19 oz.

Timing—With No. 1 piston on compression stroke, slowly turn engine until the mark "Ign" (the first line) on front vibration dampener is directly under pointer on chain cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 40. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .038 inch before T.D.C., as indicated on Gauge.

Spark Plugs—18-MM (Champion type C-15); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
1000	500	2
1400	700	4
1800	900	6
2200	1100	8
2600 (Max.)	1300	10

Ignition Coil—Auto-Lite, CE 4401.

Ignition Switch—Oakes Steering Post and Ignition Lock.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4205 (Rubber Hose Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.2	10	1150	7.1
2	850	6.3	14	1400	7.6
4	900	6.5	16	1600	7.8
6	950	6.7	18	1800 (Max.)	8.
8	1050	7.			

Motoring Freely—5.2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5½ volts.

Field Test—4.1 amps. at 6 volts across field coils in series.

Field Fuse—7½ amps. (Type 1A-7½).

Brush Spring Tension—24 to 36 oz. on each (new brushes).

Armature—Auto-Lite, GAR-2214.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

Closes—6¾ to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .020 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-N.

Location—Behind instrument board.

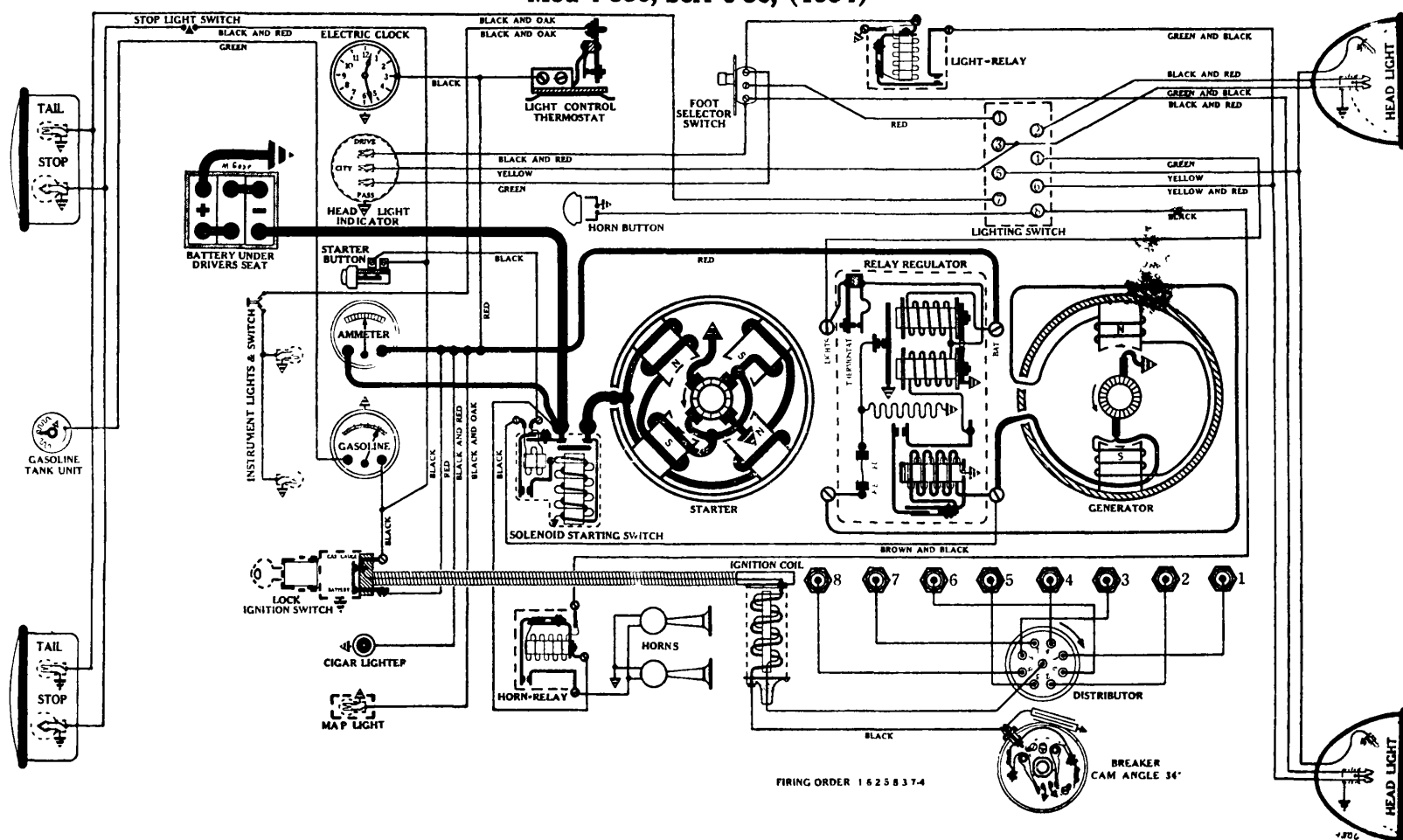
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch. Single 10 amp. fuse (type 3A-10), mounted on fuse block behind instrument board.

Foot Selector Switch—Delco-Remy, 465-Z.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; PARK—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

LA SALLE

Mod 1 350, Series 50, (1934)



BATTERY

Delco-Remy, 17-D, 6 volts. Positive Terminal Grounded
Starting Capacity—156 amps. for 20 minutes.
Lighting Capacity—6.5 amps. for 20 hours (130 amp. hour).
Box—Length, 11 $\frac{1}{4}$; width, 7; height, 9 $\frac{1}{2}$ inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 727-N

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board working in conjunction with a remote control relay (located in solenoid unit), the control relay being grounded through the generator.

Running Free—65 amps. at 5 volts, 5500 R.P.M.
Cranking Engine—240 to 260 amps. at 4.1 volts.
Lock Torque—15 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each (new brushes).
Starting Switch—Delco-Remy Solenoid, 1514 or 1516.
Push Button Starting Control Switch—Delco-Remy, 3179.
Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 662-P

(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch on each.
Cam Angles—Points closed 34 degrees; open 56 degrees (each breaker separately). Points closed 34 degrees; open 11 degrees (both together).
Contact Spring Tension—17 to 21 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.
Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when mark "IGA" (8 degrees ahead of T.D.C.) on vibration dampener is directly under pointer. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 40. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .023 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—18-MM (AC type G-9); Gap .025 to .027 inch.
Firing Order—1-6-2-5-8-3-7-4.
Automatic Advance—14 degrees (Distributor).

Eng. R.P.M.

Dist. R.P.M.

Degrees Advance (Dist.)

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
840	420	Start
1500	750	2
2400 (Intermediate)	1200	4 $\frac{1}{2}$
3000	1500	9
3420	1710	12
3700 (Max.)	1850	14

Coil and Lock Switch Assembly—Delco-Remy, 539-B.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 961-C, (Belt Drive, Air Cooled)

NOTE: This unit is a straight shunt generator with no third brush. Generator output is controlled by a vibrating point current regulator working in conjunction with the lamp load. The regulator must be used when testing these generators.

Performance Data—Gen. cold. No light load.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	650	6.2	10	850	7.1
2	700	6.3	12	900	7.3
4	725	6.5	14	950	7.6
6	760	6.7	15	1000 (Max.)	7.8
8	800	7.			

NOTE: At this point the regulator "cuts in" and the charging rate remains constant regardless of further increase in speeds.

Motoring Freely—3 amps. at 6 volts.

Max. Stall Current—22 to 24 amps. at 5 volts.

Field Test—1 $\frac{1}{2}$ amps. at 6 volts.

Field Fuse—6 amp. (type 3A-6) in regulator box.

Brush Spring Tension—22 to 26 oz. on each (new brushes).

Armature—Delco-Remy, 1836971.

Charging Adjustment—No third brush. For special instructions on units of this type see "Lamp Load Generators", Sec. AA.

RELAY-REGULATOR

Delco-Remy, 5541

Same as Cadillacs, 1934.

LIGHTING

Switch—Delco-Remy, 487-J.

Location—Foot of steering column.

Horn Relay—Delco-Remy, 266-T.

Thermostatic Lighting Current Limit Relay—Delco-Remy, 411-A.

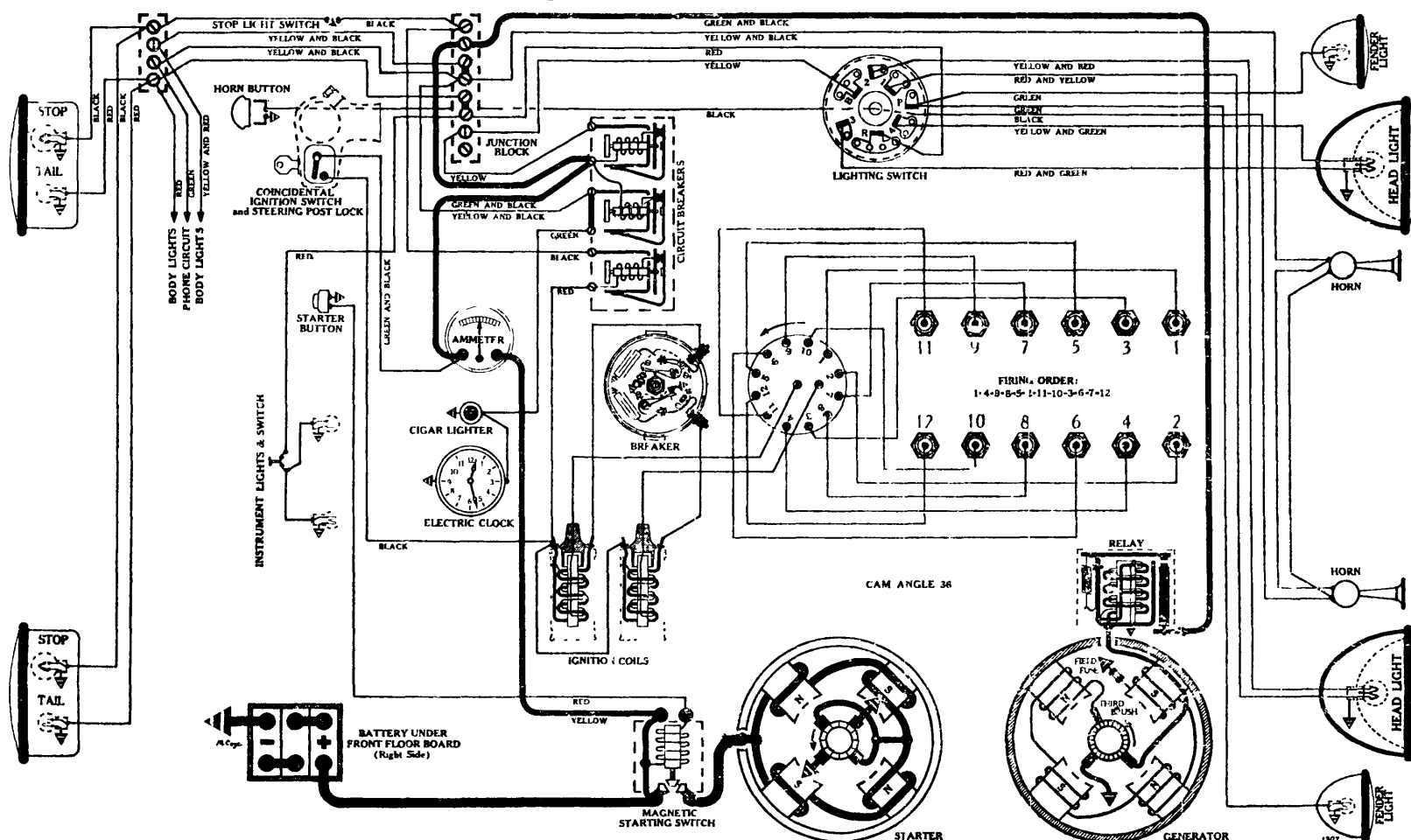
Lighting Relay—Delco-Remy, 266-T.

Foot Selector Switch—Delco-Remy, 465-Z.

Lamps—See Lamp Table, Sec. AA. HEAD—2380*; PARK—63; INSTRUMENT—63; DOME—81; HEAD LIGHT INDICATORS—40**; STOP—87; TAIL—63. *A new type bulb. **6 volt, miniature screw base, radio panel bulb.

LINCOLN

Model 67 degree "Vee" 12, Series 136 and 145, (1934)



BATTERY

Exide, X-21-L, 6 volts. Negative Terminal Grounded
Starting Capacity—147 amps. for 20 minutes.
Lighting Capacity—8.7 amps. for 20 hours.
Box—Length, 14½; width, 7-5/16; height, 8¾ inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAO-4003

Connection to Engine—Bendix Drive, Type RB10FXXTD.
Running Free—50 amps. at 5½ volts, 2700 R.P.M.
Cranking Engine—200 to 225 amps. at 4.1 volts.
Lock Torque—35 pound-feet, 720 amps. at 3 volts.
Brush Spring Tension—24 to 32 oz. on each (new brushes).
Starting Switch—Owen-Dyneto.
Location—Mounted on starter. Magnetic type switch, controlled by press button on instrument board.
Armature—Auto-Lite, MAO-2006.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGM-4002

Breakers—Contact separation .018 inch on each.
Cam Angles—Points closed 36 degrees; open 24 degrees.
Contact Spring Tension—20 to 22 oz. on each.
Synchronizing—Movable points open 33½ degrees after stationary. Unequal in intervals of 33½-26½ 33½, etc. degrees between interruptions. The stationary, or right hand set of breaker points control the right hand ignition coil, which distributes current through the "off center" high tension terminal on the distributor cap, and fires the right bank, or even numbered cylinders.
Timing—IMPORTANT! Time ignition in full advance position. Remove inspection cover on flywheel housing. Remove No. 2 spark plug, and slowly turn engine until No. 2 piston is coming up on compression stroke. Stop when flywheel mark "A 2" is opposite pointer. In this position the right hand, or stationary set of breaker points should just open. The line on flywheel marked "A-1" is for locating the position of (or synchronizing) the movable set of breaker points.
Timing with MOTOR GAUGE—Remove No. 2 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 40. Slowly turn engine until No. 2 piston is coming up on compression stroke. Stop when .032 inch before T.D.C., as indicated on Gauge. With spark in full advance position, "off-center" end of rotor under No. 2 Dist. Cap Terminal, the stationary set of breaker points should just open.
Spark Plugs—18-MM (Champion type 7); Gap .022 inch.
Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.
NOTE: All odd cylinder numbers on left bank; No. 1 nearest radiator. All even numbers on right bank (see diagram). High tension wires run from numbered terminals on Dist. Cap to corresponding numbers on cylinder blocks.
Manual Advance—10 degrees (Distributor).
Automatic Advance—13 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
1200	600	2
1800	900	4
2400	1200	6
3000	1500	8
3600	1800	10
4200	2100	12
4500 (Max.)	2250	13

Ignition Coils—Auto-Lite, CE-4001-L.

Ignition Switch—Oakes Steering Post and Ignition Lock.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GBC-4101, (Driven by Timing Chain)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	400	6.3	16	720	7.6
4	460	6.7	20	930	7.8
8	520	7.	22	1250 (Max.)	8.

Motoring Freely—5 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 6 volts.

Field Test—2.7 amps. at 6 volts across field coils in series.

Field Fuse—7½ amps. (type 1A-7½), mounted in commutator end frame.

Brush Spring Tension—22 to 27 oz. on each (new brushes).

Armature—Auto-Lite, GBC-2035.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014-B

Closes—6¾ to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .020 inch, contacts closed

LIGHTING

Switch—Lincoln, No. K-10335-B.

Location—Foot of steering column.

Circuit Breakers—Triple combination.

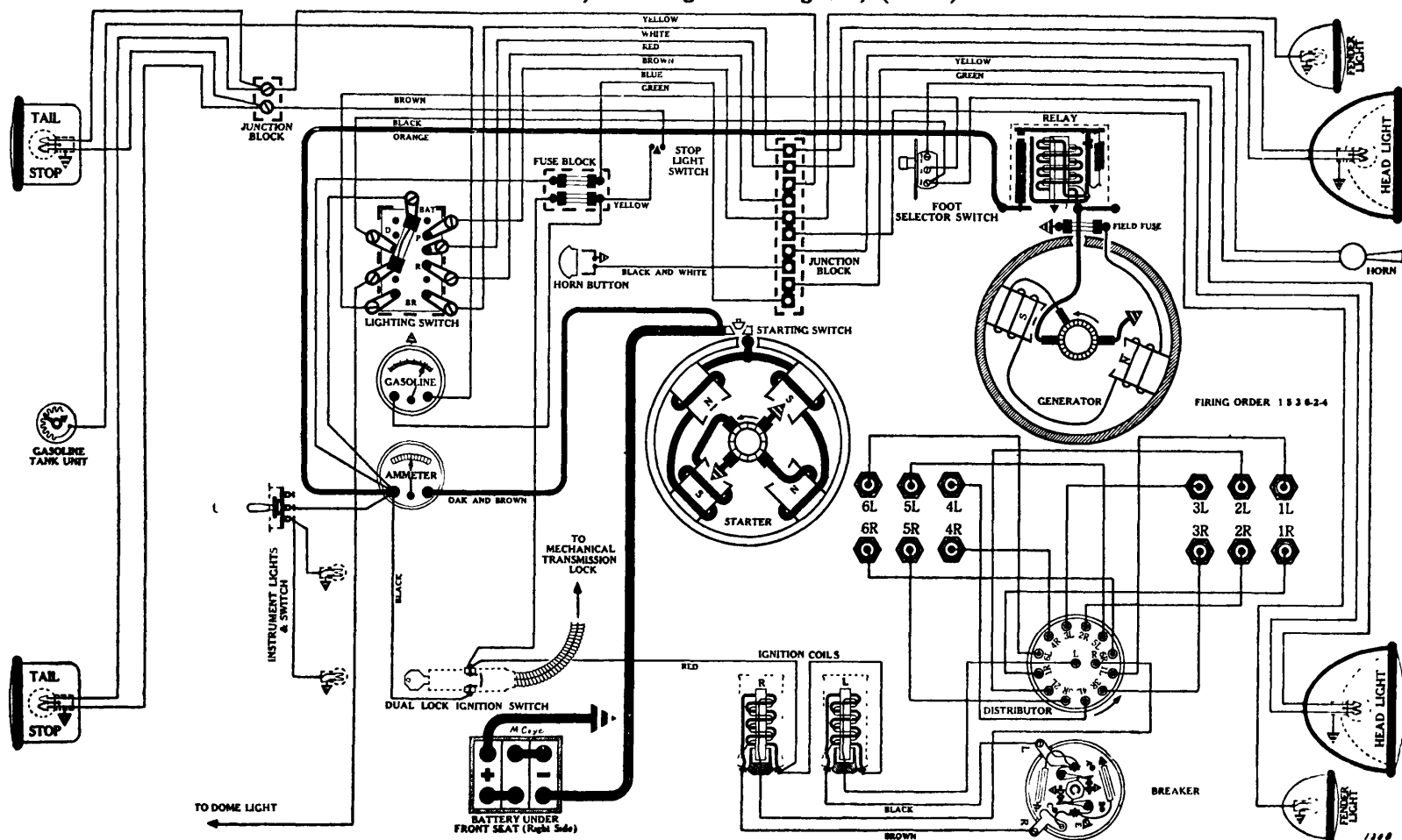
Vibrating—Starts 25 to 30 amps. Operates 10 to 15.

Lock-Out—Starts 25 to 30 amps. Operates with discharge of less than 1 amp.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; Fender—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

NASH

Model 1220, Twin Ignition Big Six, (1934)



BATTERY

U.S.L., KW-13-A, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Lighting Capacity—5 amps. for 20 hours (100 amp. hour).

Box—Length, 9-1/16; width, 7 1/8; height, 9 1/8 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4053

Connection to Engine—Bendix Drive, Type LCD11FX-10.

Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.

Cranking Engine—160 to 170 amps. at 4.2 volts.

Lock Torque—15 1/2 pound-feet, 582 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (new brushes).

Starting Switch—Auto-Lite, VC-4002 (Vacuum controlled, Clutch Pedal operated).

Armature—Auto-Lite, MAB-2057.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGE-4012
(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch on each.

Cam Angles—Points closed 32 degrees; open 28 degrees.

Contact Spring Tension—17 to 19 oz. on each.

Synchronizing—Adjust both breakers to open simultaneously. Equal 60 degree intervals between interruptions.

Timing—With No. 1 piston on compression stroke, slowly turn engine until the mark "Ign" (the first line) on front vibration dampener is directly under pointer on timing chain cover. With rotor ends under No. 1 Dist. Cap Terminals, both sets of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using special attachment for adapter No. 113 and rod No. 37. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .084 inch before T.D.C., as indicated on Gauge.

Spark Plugs—14-MM (AC type K-12); Gap .022 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400	200	Start
1040	520	6
1480	740	10
1900	950	14
2000 (Max.)	1000	15

Ignition Coils—Auto-Lite, CE-4402.

Ignition Switch—Delco-Remy, 425-U, "Dual Lock". (Combination Ignition Switch and Mechanical Transmission Lock).

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4601, (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	680	6.2	10	1095	7.1
2	795	6.3	12	1200	7.3
4	850	6.5	14	1350	7.6
6	900	6.7	16	1540	7.8
8	990	7.	18	1700 (Max.)	8.

Motoring Freely—5 1/2 amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 5 1/2 volts.

Field Test—4 1/2 amps. at 6 volts, across field coils in series.

Field Fuse—7 1/2 amps. (Type 1A-7 1/2).

Brush Spring Tension—24 to 36 oz. on each (new brushes).

Armature—Auto-Lite, GAR-2214.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021-S

Closes—6 3/4 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .020 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5620-A.

Location—Behind instrument board.

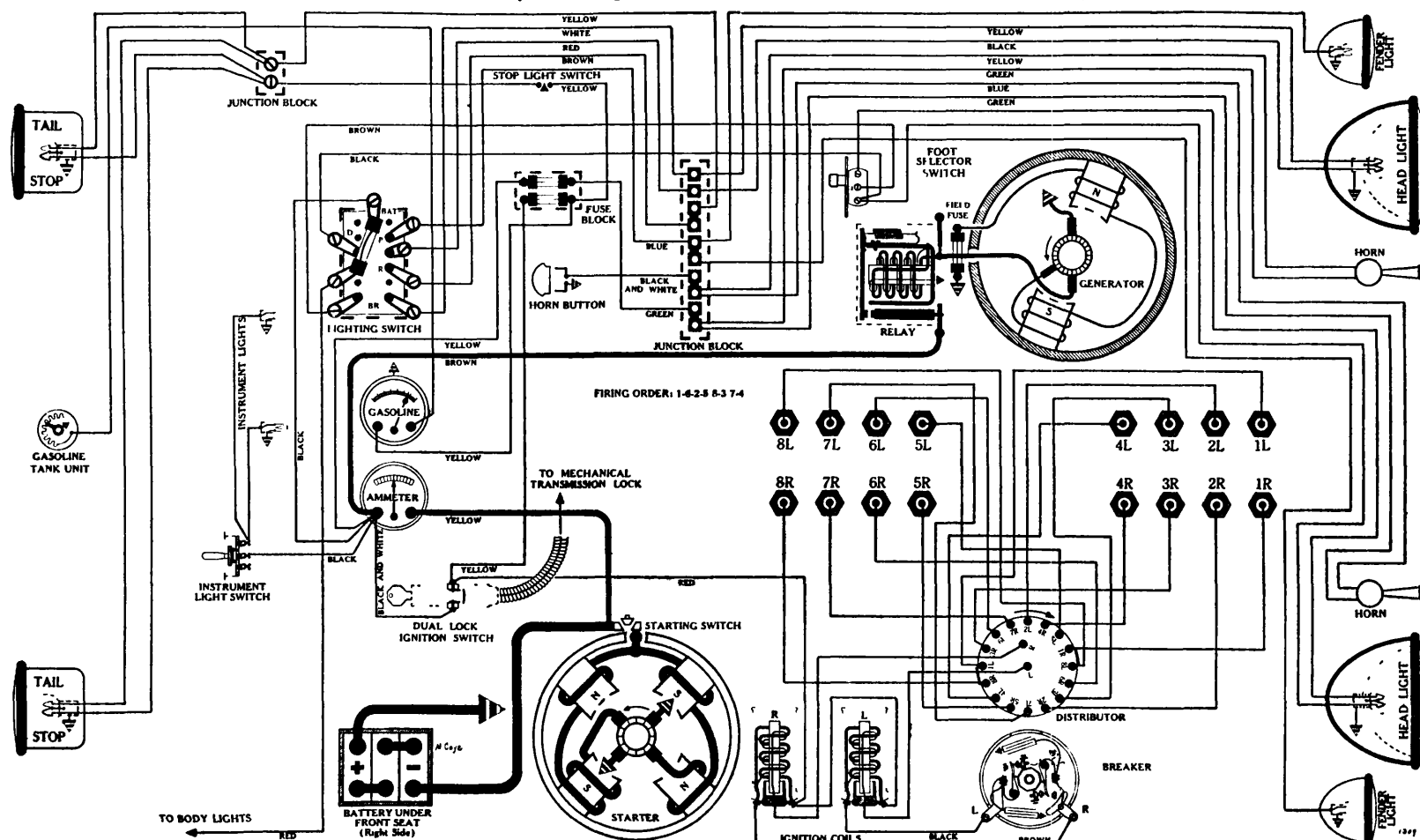
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch. Two 10 amp. fuses (type 3A-10), mounted on fuse block behind instrument board.

Foot Selector Switch—Delco-Remy, 465-Z.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; FENDER—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

NASH

Mod 1 1280, Twin Ignition Advance d Straight Eight, (1934)



BATTERY

U.S.L., KW-15-A, 6 volts. Positive Terminal Grounded
Starting Capacity—140 amps. for 20 minutes.
Lighting Capacity—5.8 amps. for 20 hours (116 amp. hour).
Box—Length, 10-7/32; width, 7 1/8; height, 9 1/8 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4054

Connection to Engine—Bendix Drive, Type LCD11FX-10.
Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.
Cranking Engine—185 to 200 amps. at 3.9 volts.
Lock Torque—15 1/2 pound-feet, 582 amps. at 3 volts.
Brush Spring Tension—44 to 56 oz. on each (new brushes).
Starting Switch—Auto-Lite, VC-4003 (Vacuum controlled, Clutch Pedal operated).
Armature—Auto-Lite, MAB-2047.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGK-4101

(Full Automatic Spark Advance)

Breakers—Contact separation .018 inch on each.
Cam Angles—Points closed 30 degrees; open 15 degrees.
Contact Spring Tension—22 to 26 oz. on each.
Synchronizing—Adjust both breakers to open simultaneously. Equal 45 degree intervals between interruptions.
Timing—With No. 1 piston on compression stroke, slowly turn engine until the mark "Ign" (the first line) on front vibration dampener is directly under pointer on timing chain cover. With rotor ends under No. 1 Dist. Cap Terminals, both sets of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using special attachment for adapter No. 113 and rod No. 37. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .082 inch before T.D.C., as indicated on Gauge.
Spark Plugs—14-MM (AC type K-12); Gap .022 inch.
Firing Order—1-6-2-5-8-3-7-4.
Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400	200	Start
1040	520	6
1480	740	10
1900	950	14
2000 (Max.)	1000	15

Ignition Coils—Auto-Lite, CE-4402.
Ignition Switch—Delco-Remy, 425-U, "Dual Lock". (Combination Ignition Switch and Mechanical Transmission Lock).

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAR-4601, (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	680	6.2	10	1095	7.1
2	795	6.3	12	1200	7.3
4	850	6.5	14	1350	7.6
6	900	6.7	16	1540	7.8
8	990	7.1	18	1700 (Max.)	8.

Motoring Freely—5 1/2 amps. at 6 volts.
Max. Stall Current—23 to 25 amps. at 5 1/2 volts.
Field Test—4 1/2 amps. at 6 volts, across field coils in series.
Field Fuse—7 1/2 amps. (Type 1A-7 1/2).
Brush Spring Tension—24 to 36 oz. on each (new brushes).
Armature—Auto-Lite, GAR-2214.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021-S

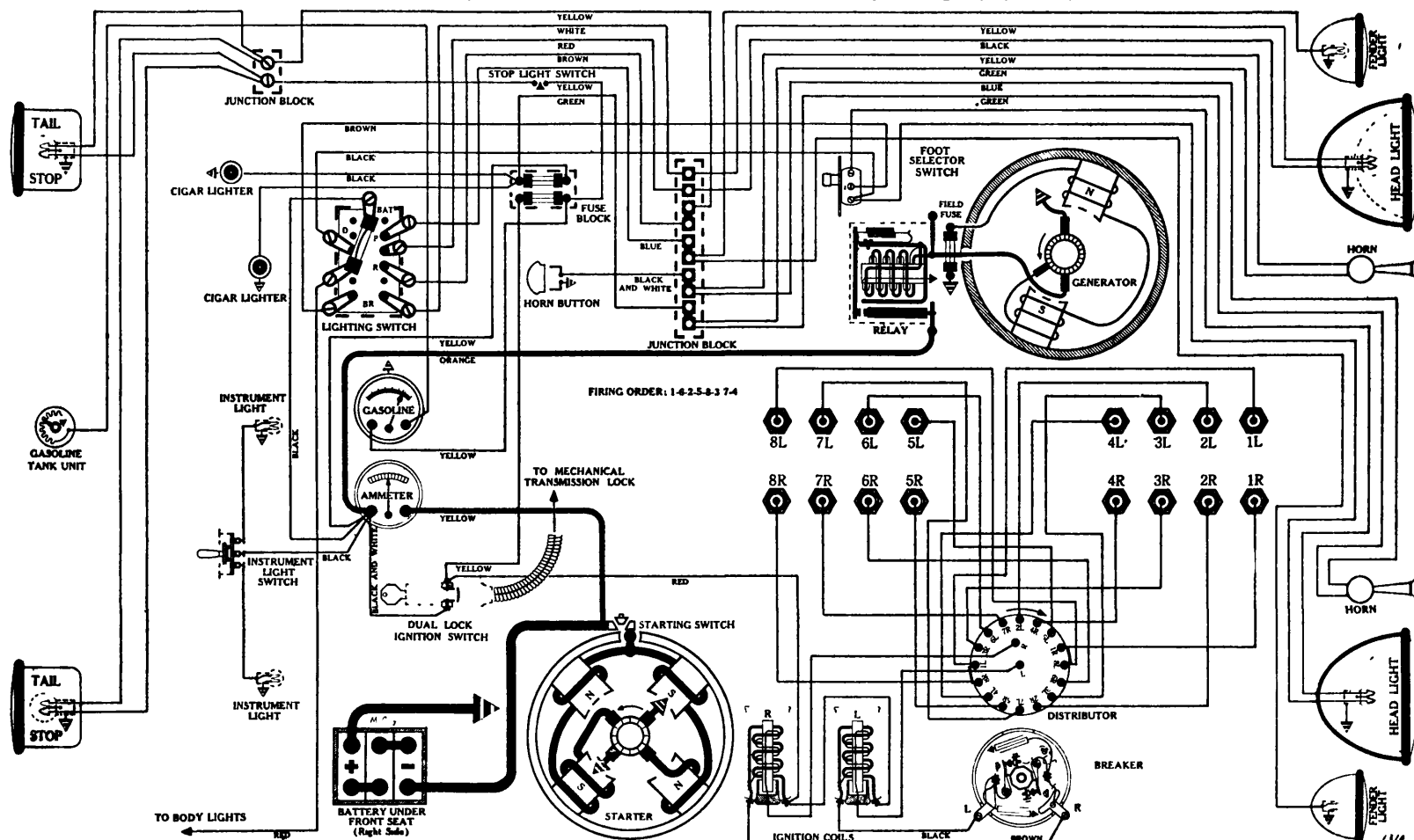
Closes—6 3/4 to 7 1/2 volts.
Opens—1/2 to 2 1/2 amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .020 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5620-A.
Location—Behind instrument board.
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.
Two 10 amp. fuses (type 3A-10), mounted on fuse block behind instrument board.
Foot Selector Switch—Delco-Remy, 465-Z.
Lamps—See Lamp Table, Sec. AA. HEAD—1116; FENDER—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

NASH

Model 1290, Twin Ignition Ambassador Straight Eight, (1934)



BATTERY

U.S.L., KR-17-A, 6 volts. Positive Terminal Grounded

Starting Capacity—155 amps. for 20 minutes.

Lighting Capacity—6.6 amps. for 20 hours (132 amp. hour).

Box—Length, 11-11/16; width, 7-1/16; height, 9 3/8 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite, MAB-4055

Connection to Engine—Bendix Drive, Type RCD10FXD.

Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.

Cranking Engine—185 to 200 amps. at 3.9 volts.

Lock Torque—15 1/2 pound-feet, 582 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (new brushes).

Starting Switch—Auto-Lite, VC-4003 (Vacuum controlled, Clutch Pedal operated).

Armature—Auto-Lite, MAB-2073.

IGNITION

Rotation, R. H., Top View

Auto-Lite, IGK-4005

(Full Automatic Spark Advance)

Breakers—Contact separation .018 inch on each.

Cam Angles—Points closed 30 degrees; open 15 degrees.

Contact Spring Tension—22 to 26 oz. on each.

Synchronizing—Adjust both breakers to open simultaneously.

Equal 45 degree intervals between interruptions.

Timing—With No. 1 piston on compression stroke, slowly turn engine until the mark "Ign" (the first line) on front vibration dampener is directly under pointer on timing chain cover. With rotor ends under No. 1 Dist. Cap Terminals, both sets of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 113 and rod No. 31. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .086 inch before T.D.C., as indicated on Gauge.

Spark Plugs—18-MM (AC type J-9); Gap .022 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—8 degrees (Distributor).

Eng. R.P.M.

Dist. R.P.M.

Degrees Advance (Dist.)

440

220

Start

830

415

2

1200

600

4

1600

800

6

1800

900

7

1980 (Max.)

990

8

Ignition Coils—Auto-Lite, CE-4402.

Ignition Switch—Delco-Remy, 425-U, "Dual Lock". (Combination Ignition Switch and Mechanical Transmission Lock).

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4601, (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	680	6.2	10	1095	7.1
2	795	6.3	12	1200	7.3
4	850	6.5	14	1350	7.6
6	900	6.7	16	1540	7.8
8	990	7.	18	1700 (Max.)	8.

Motoring Freely—5 1/2 amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 5 1/2 volts.

Field Test—4 1/2 amps. at 6 volts, across field coils in series.

Field Fuse—7 1/2 amps. (Type 1A-7 1/2).

Brush Spring Tension—24 to 36 oz. on each (new brushes).

Armature—Auto-Lite, GAR-2214.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021-S

Closes—6 3/4 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .020 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5620-A.

Location—Behind instrument board.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.

Two 10 amp. fuses (type 3A-10), mounted on fuse block behind instrument board.

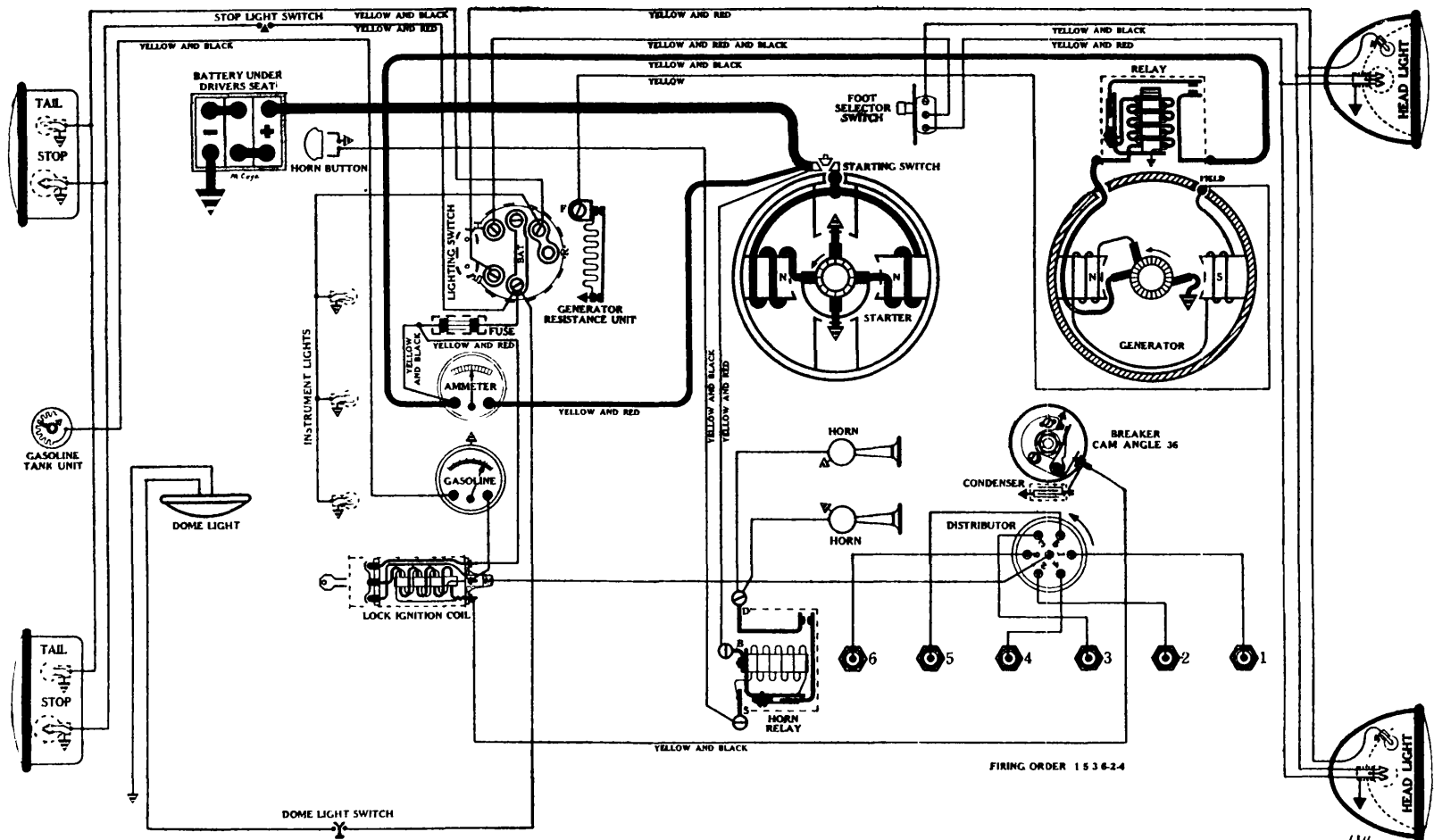
Foot Selector Switch—Delco-Remy, 465-Z.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; FENDER—63;

INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

OLDSMOBILE

Model F-34, 6 cyl., (1934)



BATTERY

Delco-Remy, 15-R, 6 volts. Negative Terminal Grounded
Starting Capacity—115 amps. for 20 minutes.
Lighting Capacity—4.7 amps. for 20 hours (94 amp. hour).
Box—Length, 8-15/16; width, 7; height, 8-11/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 734-K

Connection to Engine—Mechanical gear shift, incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—175 to 180 amps. at 4.5 volts.
Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each (new brushes).
Starting Switch—Delco-Remy, 820052.
Armature—Delco-Remy, 823881.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 622-S

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 36 degrees; open 24 degrees.
Contact Spring Tension—17 to 21 oz.
Timing—NOTE: Two marks will be found on the outside rim of the vibration dampener, and an indicating pointer is located on the front chain cover. The first mark to come under the pointer when engine is turned indicates .004 inch piston travel before T.D.C. The second mark indicates exact T.D.C., cylinders 1 and 6. With No. 1 piston coming up on compression stroke, stop when first mark is opposite pointer. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 40. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .004 inch before T.D.C., as indicated on Gauge.
Spark Plugs—Metric (AC type G-9); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
540	270	Start
1300	650	4
2060	1030	8
3000 (Intermediate)	1500	13
3800 (Max.)	1900	15

Lock Ignition Coil—Delco-Remy, 534-N.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 935-F, (Belt Drive)

NOTE: Use following data when adjusting unit in a test bench. If adjustments are to be made with unit on car read data on 1934 Lamp Control Generators, Sec. AA.

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
2	700	6.4	10	1000	7.1
4	750	6.5	12	1100	7.3
5	800	6.6	15	1400	7.5
7	850	6.8	17	2000	7.8
8	900	6.9	19	2400 (Max.)	8.

Motoring Freely—4 amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—2.3 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

RELAY

Delco-Remy, 265-H

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-V (with generator field resistance).

Location—Behind instrument board, operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20) in tubular holder on wire, behind instrument board, which runs between ammeter and "Bat." terminal on lighting switch.

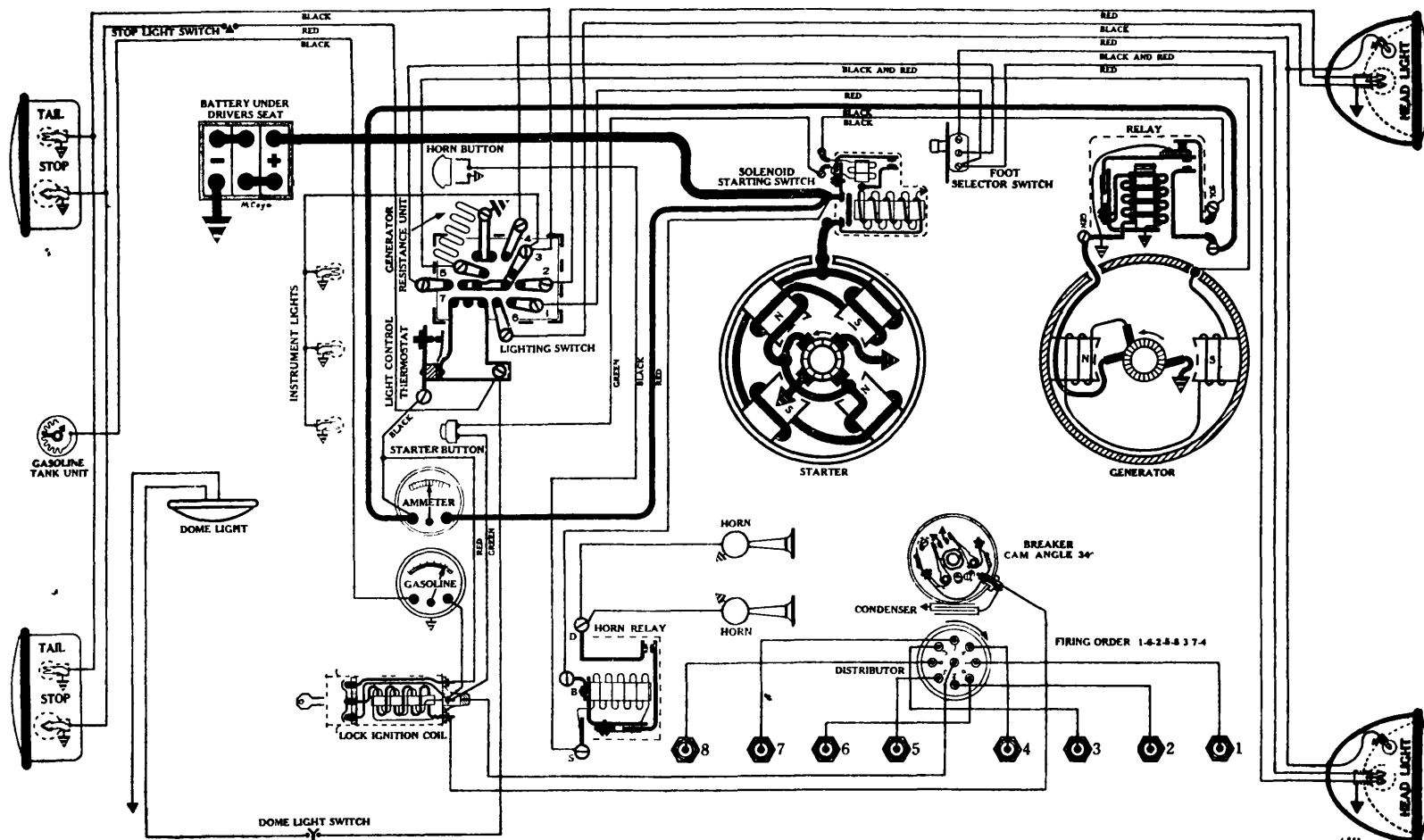
Foot Selector Switch—Delco-Remy, 465-W.

Horn Relay—Delco-Remy, 268-L.

Lamps—See Lamp Table, Sec. AA. HEAD—2320-C*; PARK—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63. A new type bulb.

OLDSMOBILE

Model L-34, Straight Eight, (1934)



BATTERY

Delco-Remy, 17-G, 6 volts. Negative Terminal Grounded
Starting Capacity—131 amps. for 20 minutes.
Lighting Capacity—5.35 amps. for 20 hours (107 amp. hour).
Box—Length, 10%; width, 7; height, 8½ inches.

STARTER

Rotation, L. H., Com. End.
Delco-Remy, 727-H

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board working in conjunction with a remote control relay (located in solenoid unit), and an auxiliary set of grounding points found on cut-out relay.

Running Free—65 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—160 to 175 amps. at 4.3 volts.
Lock Torque—15 pound-feet, 600 amps. at 3 volts.
Brush Spring Tension—24 to 28 oz. on each (new brushes).
Starting Switch—Delco-Remy Solenoid, 1514.
Push Button Starting Control Switch—Delco-Remy, 1385.
Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 662-N
(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch on each.
Cam Angles—Points closed 34 degrees; open 56 degrees (each breaker separately). Points closed 34 degrees; open 11 degrees (both together).

Contact Spring Tension—17 to 21 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.

Timing—NOTE:—Two marks will be found on the outside rim of the vibration dampener, and an indicating pointer is located on the front chain cover. The first mark to come under the pointer when engine is cranked indicates .005 inch piston travel before T.D.C. The second mark indicates exact T.D.C., cylinders 1 and 8. With No. 1 piston coming up on compression stroke stop when first mark is opposite pointer. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .005 inch before T.D.C., as indicated on Gauge.

Spark Plugs—18-MM (AC type G-9); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—13½ degrees (Distributor).

Eng. R.P.M.

600
1300
2000
2690
3260 (Max.)

Dist. R.P.M.

300
650
1000
1345
1630

Degrees Advance (Dist.)

2
5
8
11
18½

Lock Ignition Coil—Delco-Remy, 534-N.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 935-M, (Belt Drive)

NOTE Use following data when adjusting unit in a test bench. If adjustments are to be made with unit on car read data on 1934 Lamp Control Generators, Sec. AA

Performance Data—Gen. cold. Field Terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
2	700	6.4	10	1000	7.1
5	800	6.6	15	1400	7.5
7	850	6.8	17	2000	7.8
8	900	6.9	19	2400 (Max.)	8.

Motoring Freely—4 amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—2.3 amps. at 6 volts, across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (New brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAYS

Cut-Out Relay, Delco-Remy, 265-S

NOTE: This is a new type unit with an extra terminal which is grounded thru an auxiliary set of points when the cut out points are open.

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-R. A combination switch with overload lighting circuit thermostat and generator shunt field resistance unit mounted on switch back.

Location—Behind instrument board, operated by pull knob.

Overload Thermostat—Opens when load exceeds 30 amps. Limits current flow to from 5 to 15 amps.

Foot Selector Switch—Delco-Remy, 465-W.

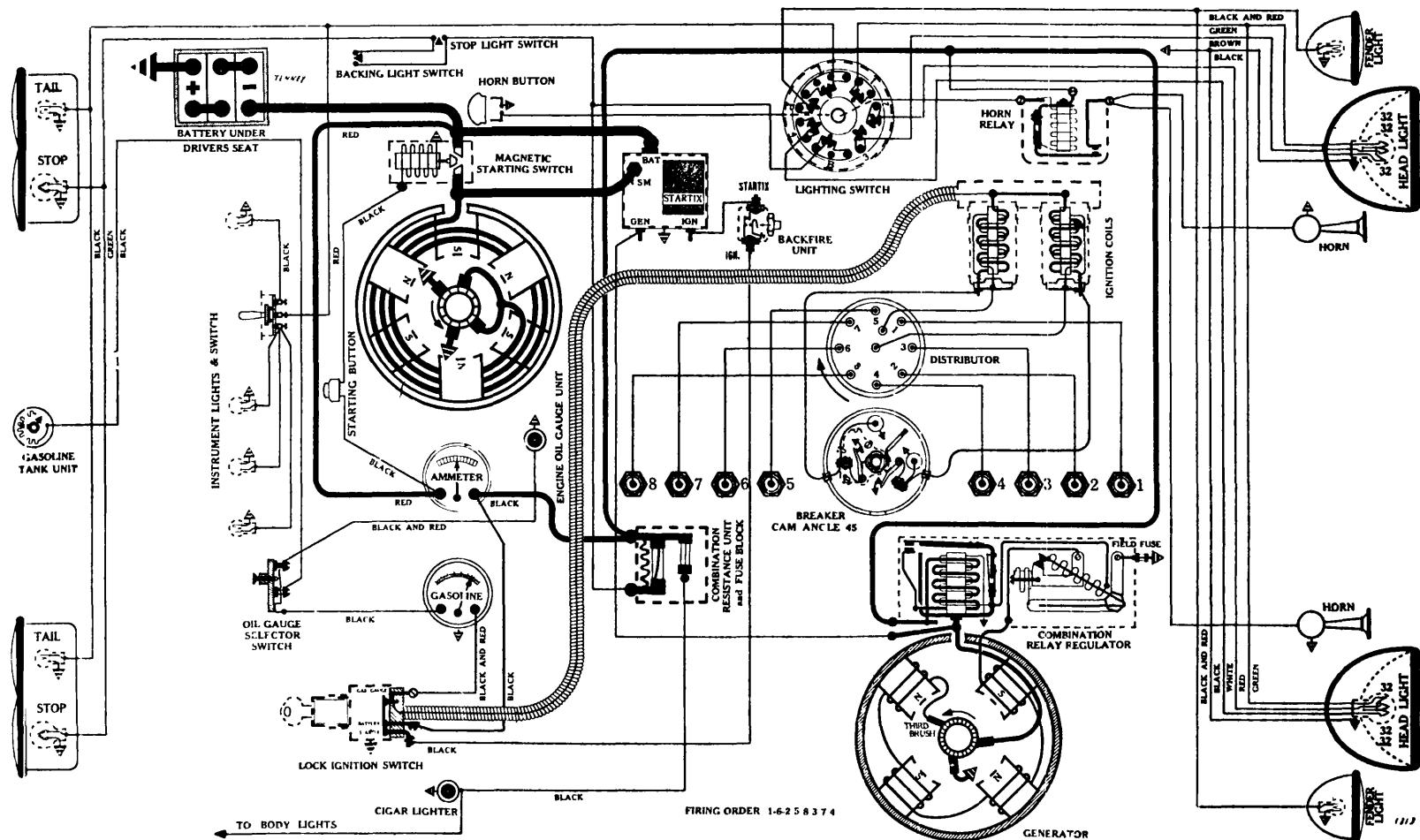
Horn Relay—Delco-Remy, 268-L.

Lamps—See Lamp Table, Sec. AA. HEAD—2320-C; PARK—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

*A new type bulb.

PACKARD

Models 1100, 1101 and 1102, Standard Straight Eights, (1934)



BATTERY

Prest-O-Lite, A6-19-ST, 6 volts. Positive Terminal Grounded

Starting Capacity—175 amps. for 20 minutes.

Lighting Capacity—7.5 amps. for 20 hours (150 amp. hour).

Box—Length, 13; width, 7; height, 9-3/16 inches.

NOTE: Battery under driver's seat. May be serviced by lifting cushion. To change battery, work from beneath car, first loosening carrier and then removing battery.

STARTER

Rotation, L. H., Com. End
Owen-Dyneto, Type DI-1161

Connection to Engine—Bendix Drive, Type R10FXTD.

Running Free—60 amp. at 6 volts, 4500 R.P.M.

Cranking Engine—260 to 280 amps. at 3 1/2 volts.

Lock Torque—25 pound-feet, 650 amps. at 3 1/2 volts.

Brush Spring Tension—26 to 28 oz. on each (new brushes).

Starting Switches—Owen-Dyneto Magnetic, Type 21518, mounted on starting motor, and operated by push button on instrument board. Startix, Type D, Automatic Starting Switch and Anti-Stall Device.

Armature—Owen-Dyneto, 13292.

IGNITION

Rotation, R. H., Top View
North East, Type 5033450

(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch on each.

Cam Angles—Points closed 45 degrees; open 45 degrees.

Contact Spring Tension—15 to 19 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when sixth graduation ahead of "DC" mark on vibration dampener is under pointer on timing case. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 114 and rod No. 5. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .015 inch before T.D.C., as indicated on Gauge.

Spark Plugs—14-MM (AC type K-7); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—9 3/4 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
460	230	Start
1060	530	3
1460	730	5
2060	1030	8
2400 (Max.)	1200	9 3/4

IMPORTANT! Early model, type 5033450 N.E. distributors, were built by the Delco Appliance Co., and were not stamped with a serial number. Later units built by Delco Remy are marked with a serial number. Above table for units with serial number. See 1933 Packard Straight Eights for early model spark table. Coils and Lock Switch Assembly—North East, 5033449.

GENERATOR

Rotation, L. H., Com. End

Owen-Dyneto, Type CO-1177, (Air Cooled)

IMPORTANT NOTE: The drive end generator bearing is part of engine. Do not run unit in test bench until special Dyneto bearing is attached.

Performance Data—Gen. cold. Charge Regulator closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	475	6.5	14	700	7.2
4	520	6.8	20	1000	7.5
8	575	7.0	24	1500 (Max.)	8.0

Motoring Freely—3 to 3 1/2 amps. at 6 volts.

Max. Stall Current—25 to 28 amps. at 6 volts.

Field Test—2.3 amps. at 6 volts across field coils in series.

Field Fuse—3 amps. (type 1A-3), mounted in charge regulator.

Brush Spring Tension—20 to 22 oz. on each (new brushes).

Armature—Owen-Dyneto, 23661.

Third Brush Adjustment—Not necessary to loosen cover band. See Fig. 18, "Third Brush Adjustment" page, Sec. AA.

CHARGE REGULATOR AND RELAY

Owen-Dyneto, Type 21262

Relay Closes—6 1/2 to 7 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.015 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—R.B.M. Mfg. Co., type LS-600.

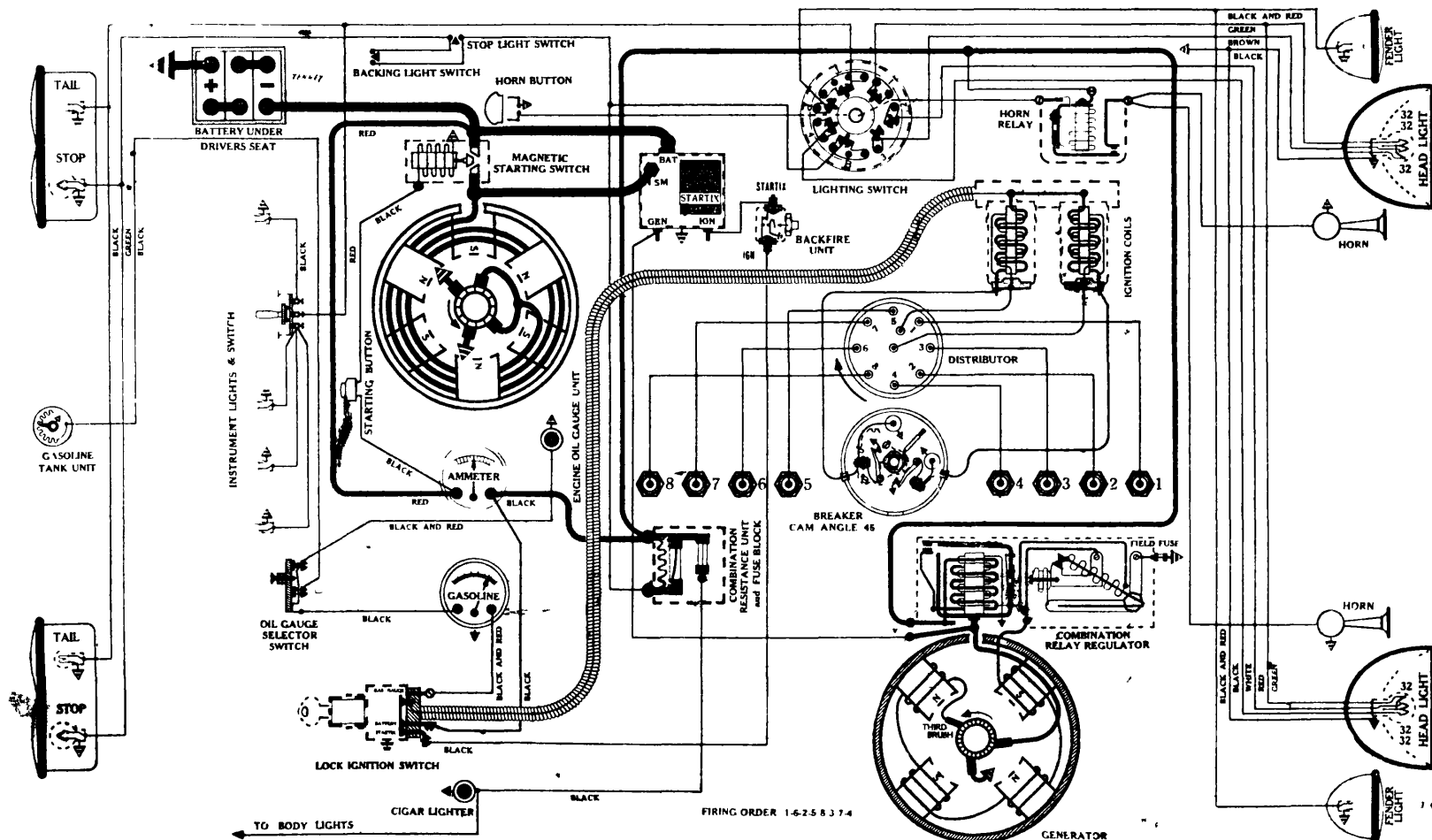
Location—Foot of steering column.

Fuses—Two fuses mounted on North East Fuse Block and Resistance Assembly, No. 5030861.

Lamps—See Lamp Table, Sec. AA. HEAD—3003; FENDER—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

PACKARD

Mod ls 1103, 1104 and 1105, Super Straight Eights, (1934)



BATTERY

Prest-O-Lite, A6-19-ST, 6 volts. Positive Terminal Grounded
Starting Capacity—175 amps. for 20 minutes.
Lighting Capacity—7.5 amps. for 20 hours (150 amp. hour).
Box—Length, 13; width, 7; height, 9-3/16 inches.

NOTE Battery under driver's seat. May be serviced by lifting cushion. To change battery, work from beneath car, first loosening carrier and then removing battery.

STARTER

Rotation, L. H., Com. End
Owen-Dyneto, Type DN-1163

Connection to Engine—Bendix Drive, Type R10FXTD.

Running Free—50 amps. at 6 volts, 3000 R.P.M.

Cranking Engine—290 to 300 amps. at 3 1/2 volts.

Lock Torque—35 pound-feet, 650 amps. at 3 1/2 volts.

Brush Spring Tension—26 to 28 oz. on each (new brushes).

Starting Switches—Owen-Dyneto Magnetic, Type 21518, mounted on starting motor, and operated by push button on instrument board. Startix, Type D, Automatic Starting Switch and Anti-Stall Device.

Armature—Owen-Dyneto, 13409.

IGNITION

Rotation, R. H., Top View
North East, Type 5033450
(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch on each.

Cam Angles—Points closed 45 degrees; open 45 degrees.

Contact Spring Tension—15 to 19 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Equal 45 degree intervals between interruptions.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when sixth graduation ahead of "DC" mark on vibration dampener is under pointer on timing case. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 114 and rod No. 5. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .015 inch before T.D.C., as indicated on Gauge.

Spark Plugs—14-MM (AC type K-7); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—9 3/4 degrees (Distributor).

Eng. R.P.M.

Dist. R.P.M.

Degrees Advance (Dist.)

460
1060
1460
2060
2400 (Max.)

230
530
730
1030
1200

Start
3
5
8
9 1/4

IMPORTANT! Early model, type 5033450 N.E. distributors were built by the Delco Appliance Co. and were not stamped with a serial number. Later units built by Delco Remv are marked with a serial number. Above table for units with serial number. See 1933 Packard Straight Lights for early model sparkable Coils and Lock Switch Assembly—North East, 5033449.

GENERATOR

Rotation, L. H., Com. End
Owen-Dyneto, Type CO-1177, (Air Cooled)

IMPORTANT NOTE The drive end generator bearing is part of engine. Do not mount in test bench until special Dyneto bearing is attached.

Performance Data—Gen. cold. Charge Regulator closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	475	6.5	14	700	7.2
4	520	6.8	20	1000	7.5
8	575	7.0	24	1500 (Max.)	8.0

Motoring Freely—3 to 3 1/2 amps. at 6 volts.

Max. Stall Current—25 to 28 amps. at 6 volts.

Field Test—2.3 amps. at 6 volts across field coils in series.

Field Fuse—3 amps. (type 1A-3), mounted in charge regulator.

Brush Spring Tension—20 to 22 oz. on each (new brushes).

Armature—Owen-Dyneto, 23661.

Third Brush Adjustment—Not necessary to loosen cover band. See Fig. 18, "Third Brush Adjustment" page, Sec. AA.

CHARGE REGULATOR AND RELAY

Owen-Dyneto, Type 21262

Relay Closes—6 1/2 to 7 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.015 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—R.B.M. Mfg. Co., type LS-600.

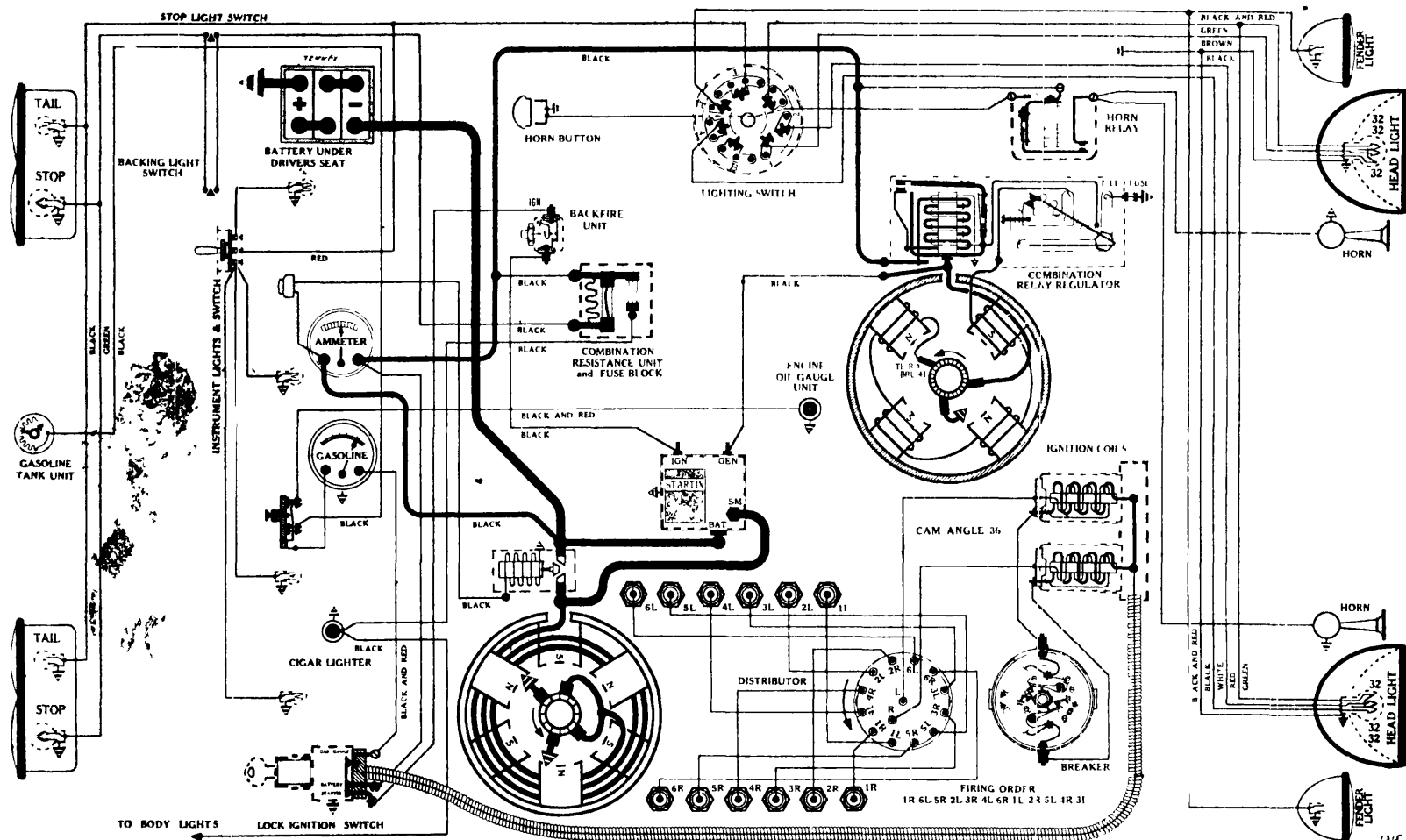
Location—Foot of steering column.

Fuses—Two fuses mounted on North East Fuse Block and Resistance Assembly, No. 5030861.

Lamps—See Lamp Table, Sec. AA. HEAD—3003; FENDER—63; INSTRUMENT—63; DOME—81; STOP—81; TAIL—63.

PACKARD

Models 1107 and 1108, 67 degree "V e" 12, (1934)



BATTERY

Prest-O-Lite, A6-19-ST, 6 volts. Positive Terminal Grounded

Starting Capacity—175 amps. for 20 minutes.

Lighting Capacity—7.5 amps. for 20 hours (150 amp. hour).

Box—Length, 13; width, 7; height, 9-3/16 inches.

NOTE: Battery under driver's seat. May be serviced by lifting cushion. To change battery, work from beneath car, first loosening carrier and then removing battery.

STARTER

Rotation, L. H., Com. End

Owen-Dyneto, Type DN-1162

Connection to Engine—Bendix Drive, Type R10FXTD.

Running Free—50 amps. at 6 volts, 3000 R.P.M.

Cranking Engine—290 to 300 amps. at 3 1/2 volts.

Lock Torque—35 pound-feet, 650 amps. at 3 1/2 volts.

Brush Spring Tension—26 to 28 oz. on each (new brushes).

Starting Switches—Owen-Dyneto Magnetic, Type 21518, mounted on starting motor, and operated by push button on instrument board. Startix, Type D, Automatic Starting Switch and Anti-Stall Device.

Armature—Owen-Dyneto, 13409.

IGNITION

Rotation, L. H., Top View

Auto-Lite, IGO-4001

(Full Automatic Spark Advance)

Breakers—Contact separation .018 inch on each.

Cam Angles—Points closed 36 degrees; open 24 degrees.

Contact Spring Tension—20 to 22 oz. on each.

Synchronizing—Unequal intervals of 35 1/2-26 1/2-33 1/2, etc., degrees between interruptions.

Timing—With No. 1R piston on compression stroke, slowly turn engine until the eighth graduation ahead of "1R-UDC" mark on vibration dampener is under pointer on timing case. With rotor under No. 1R Dist. Cap Terminal, stationary set of breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1R spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 2. Slowly turn engine until No. 1R piston is coming up on compression stroke. Stop when .022 inch (equivalent to 8° advance on flywheel) before T.D.C., as indicated on Gauge.

Spark Plugs—14-MM (AC type K-7); Gap .025 to .030 inch.

Firing Order—1R-6L-5R-2L-3R-4L-6R-1L-2R-5L-4R-3L.

Automatic Advance—8 degrees (Distributor)

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
780	390	2
1100	550	4
1700	850	6
2800 (Max)	1400	8

Coils and Lock Switch Assembly—Auto-Lite, CE-4023.

GENERATOR

Rotation, L. H., Com. End

Owen-Dyneto, Type CO-1166 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Charge Regulator closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	475	6.5	14	700	7.2
4	520	6.8	20	1000	7.5
8	575	7.0	24	1500 (Max.)	8.0

Motoring Freely—3 to 3 1/2 amps. at 6 volts.

Max. Stall Current—25 to 28 amps. at 6 volts.

Field Test—2.3 amps. at 6 volts across field coils in series.

Field Fuse—3 amps. (type 1A-3), mounted in charge regulator.

Brush Spring Tension—20 to 22 oz. on each (new brushes).

Armature—Owen-Dyneto, 23566.

Third Brush Adjustment—Not necessary to loosen cover band. See

Fig. 18, "Third Brush Adjustment" page, Sec. AA.

CHARGE REGULATOR AND RELAY

Owen-Dyneto, Type 21262

Relay Closes—6 1/2 to 7 volts.

Opens—0 to 2 amps. discharge.

Contact Gap—.015 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—R.B.M. Mfg. Co., type LS-600.

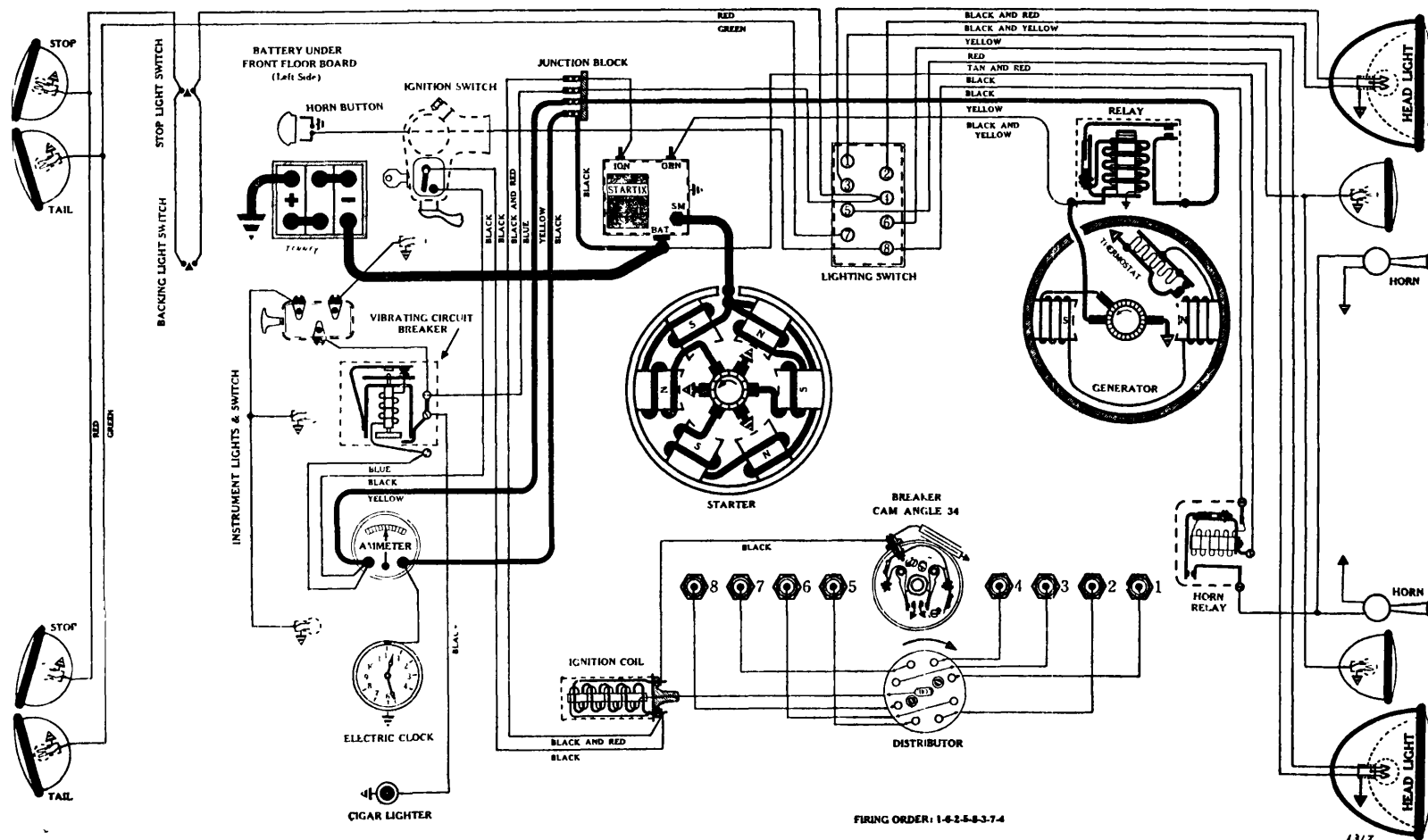
Location—Foot of steering column.

Fuses—Two fuses mounted on North East Fuse Block and Resistance Assembly, No. 5030861.

Lamps—See Lamp Table, Sec. AA. HEAD—3003; FENDER—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

PIERCE - ARROW

Model 840-A, Straight Eight, (1934)



BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded
Starting Capacity—160 amps. for 20 minutes.
Lighting Capacity—6.8 amps. for 20 hours (136 amp. hour).
Box—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 497

Connection to Engine—Bendix Drive, Type R11SXT-10.
Running Free—70 amps. at 5 volts, 3000 R.P.M.
Cranking Engine—230 to 245 amps at 4.1 volts.
Lock Torque—19 pound-feet, 500 amps. at 3 volts.
Brush Spring Tension—36 to 40 oz. on each (new brushes).
Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.
Armature—Delco-Remy, 1843420.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 662-J

Breakers—Contact separation .020 inch on each.
Cam Angles—Points closed 34 degrees; open 56 degrees (each breaker separately). Points closed 34 degrees; open 11 degrees (both together).
Contact Spring Tension—17 to 21 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.
Timing—IMPORTANT! Time ignition in full advance position. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "Ign-1-8" (found 5 degrees or 2½ flywheel teeth ahead of T.D.C. mark) is directly in line with pointer at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, adjustable set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 114 and rod No. 29. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .010 inch before T.D.C., as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, adjustable set of breaker points should just open.
Spark Plugs—14-MM (Champion type J-5); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—16½ degrees (Distributor).

Automatic Advance—9 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
300	150	Start
600	300	1
1540	770	4
2160	1080	6
3100 (Max.)	1550	9

Ignition Coil—Delco-Remy, 537-E.

Ignition Switch—Oakes Steering Post and Ignition Lock.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-V, (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	12	1200	7.8
5	800	7.1	16	1600	8.
9	1000	7.5	20	1700 (Max.)	8.2

Motoring Freely—3 to 3½ amps. at 6 volts.

Max. Stall Current—19 to 21 amps. at 6 volts.

Field Test—2 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each (new brushes).

Armature—Delco-Remy, 1839078.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Pierce-Arrow No. 703039 (round type, soldered connections).

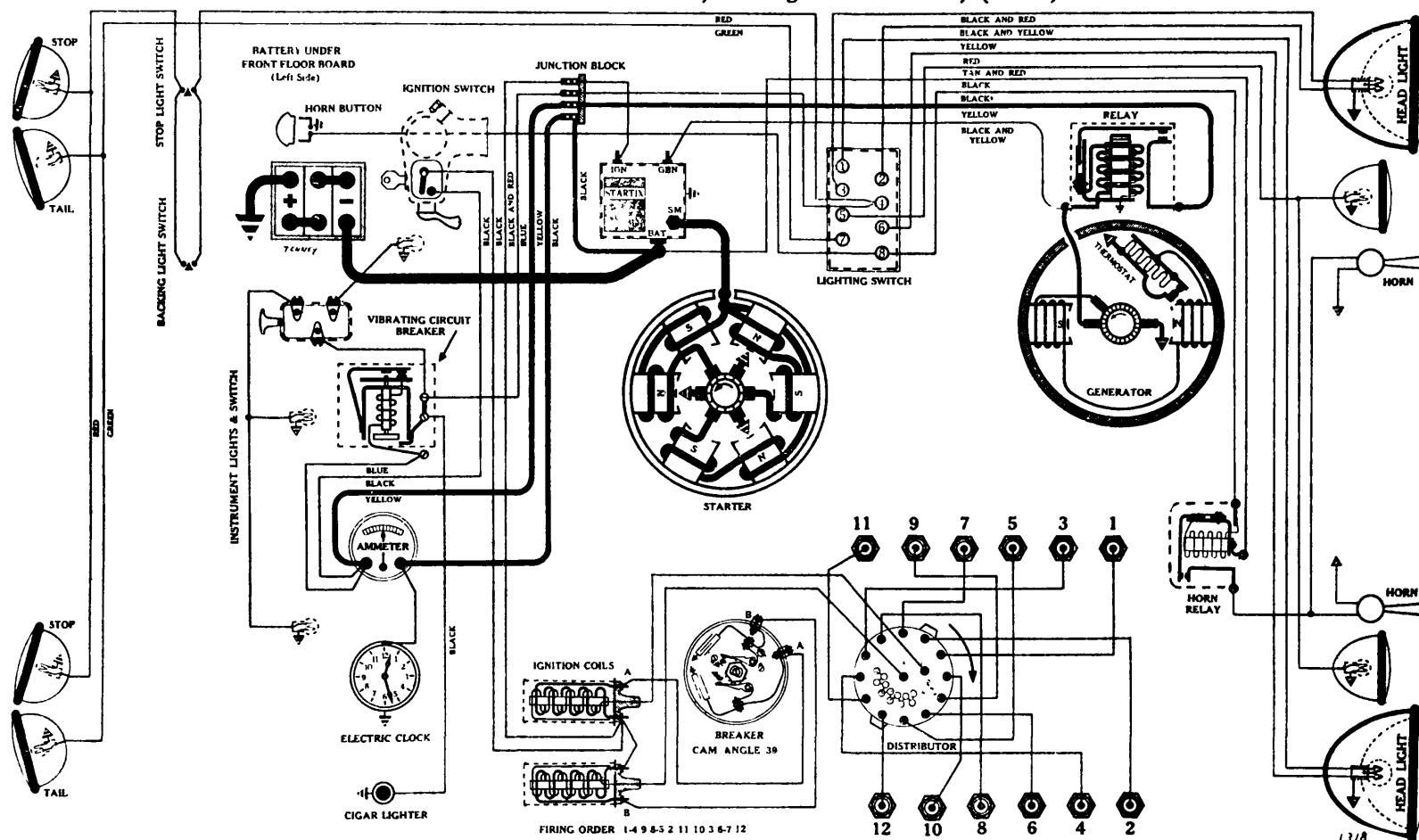
Location—Foot of steering column.

Vibrating Circuit Breaker—Delco-Remy, 410-F. Starts 30 to 35 amps. Operates 5 to 18 amps.

Lamps—See Lamp Table, Sec. AA. HEAD—1000; FENDER—81; INSTRUMENT—63; DOME—81; STOP—63; TAIL—81.

PIERCE-ARROW

Models 1240-A and 1248-A, 80 degree "Vee" 12, (1934)



BATTERY

Willard, WH-5-19, 6 volts. Positive Terminal Grounded
Starting Capacity—180 amps. for 20 minutes.
Lighting Capacity—7.6 amps. for 20 hours (153 amp. hour).
Box—Length, 13; width, 7-1/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 498

Connection to Engine—Bendix Drive, Type R11SXT-10.
Running Free—70 amps. at 5 volts, 3000 R.P.M.
Cranking Engine—230 to 245 amps. at 4.1 volts, 100 to 150 R.P.M.
Lock Torque—19 pound-feet, 500 amps. at 3 volts.
Brush Spring Tension—36 to 40 oz. on each (new brushes).
Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.
Armature—Delco-Remy, 1843420.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 4105

Breaker—Contact separation .018 inch on each.
Cam Angles—Points closed 39 degrees; open 21 degrees.
Contact Spring Tension—17 to 21 oz. on each.
Synchronizing—Moveable points (which fire right bank) open 20 degrees after stationary. Unequal intervals of 20-40-20, etc. degrees between interruptions.
Timing—IMPORTANT! Time ignition in full advance position. Slowly turn engine until No. 1 piston (left bank) is coming up on compression stroke. Stop when flywheel mark "Ign. No. 1" is directly in line with pointer, at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .008 inch before T.D.C., as indicated on Gauge.
Spark Plugs—14-MM (Champion type J-5); Gap .025 inch.
Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.

NOTE: All odd cylinder numbers on left bank, No. 1 nearest radiator. All even numbers on right bank (see diagram).

Manual Advance—16 1/2 degrees (Distributor).

Automatic Advance—7 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
500	250	Start
800	400	1
1480	740	3
2140	1070	5
2800 (Max.)	1400	7

Ignition Coils—Delco-Remy, 537-E.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 927-V, (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	12	1200	7.8
5	800	7.1	16	1600	8.
9	1000	7.5	20	1700 (Max.)	8.2

Motoring Freely—3 to 3 1/2 amps. at 6 volts.

Max. Stall Current—19 to 21 amps. at 6 volts.

Field Test—2 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 28 oz. on each (new brushes).

Armature—Delco-Remy, 1839078.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Pierce-Arrow No. 703039 (round type, soldered connections).

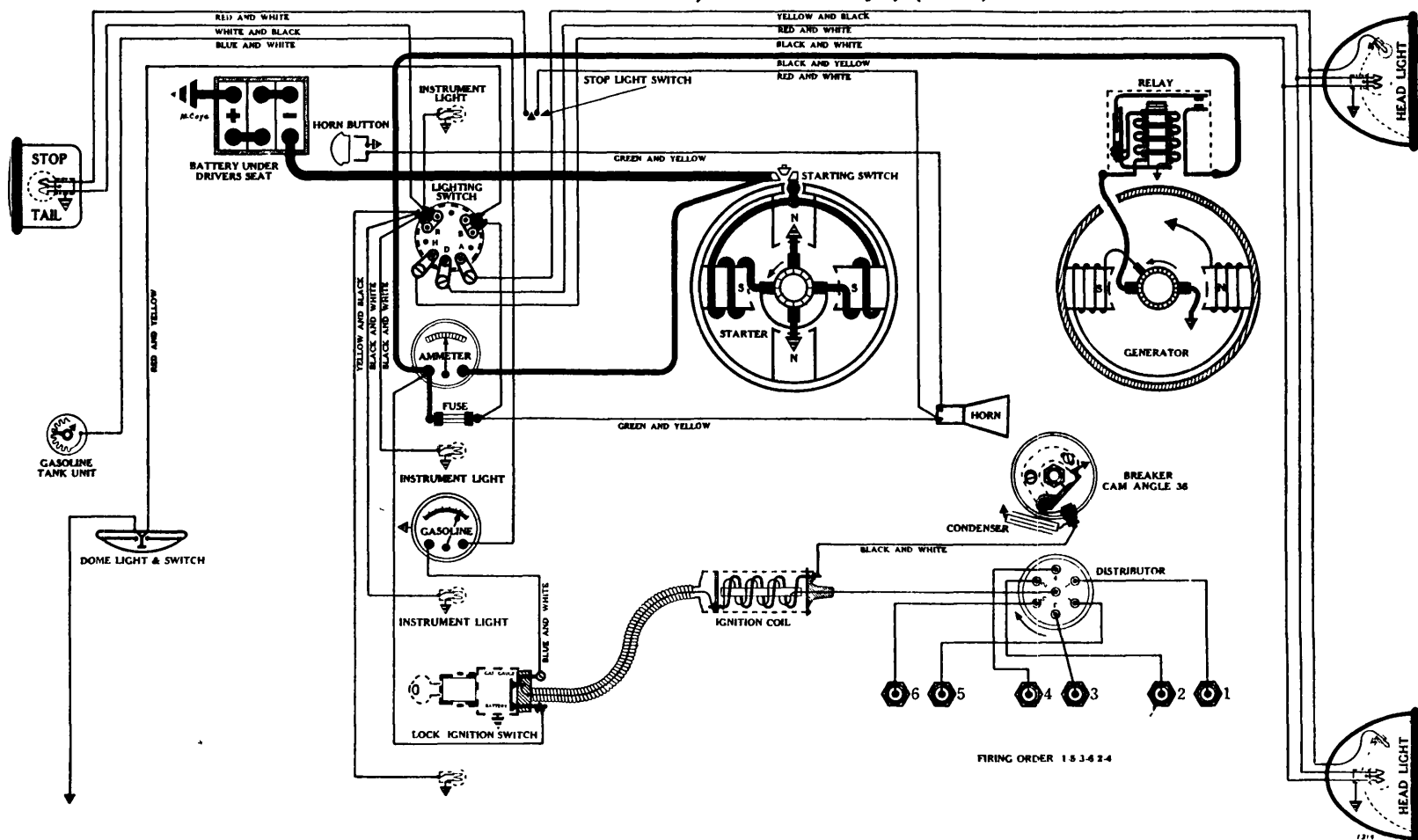
Location—Foot of steering column.

Vibrating Circuit Breaker—Delco-Remy, 410-F. Starts 30 to 35 amps. Operates 5 to 18 amps.

Lamps—See Lamp Table, Sec. AA. HEAD—1000; FENDER—81; INSTRUMENT—63; DOME—81; STOP—63; TAIL—81.

PLYMOUTH

Models PF and PG, Standard 6 cyl., (1934)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—105 amps. for 20 minutes.

Lighting Capacity—4.3 amps. for 20 hours (86 amp. hour).

Box—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 734-H

Connection to Engine—Mechanical pinion shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on motor.

Running Free—65 amp. at 5 volts, 5000 R.P.M.

Cranking Engine—165 to 180 amps. at 4.2 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 622-U

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 36 degrees; open 24 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Remove inspection cover plate, located on left side of flywheel housing, directly below starting motor. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "DC" exactly lines up with pointer marked "Ign" on timing indicator plate. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove the 1/8 inch pipe plug (located above No. 6 piston), and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12, or remove No. 1 spark plug and attach Gauge, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. On engines with an iron alloy head and type S-9 spark plugs (standard head), stop when .032 inch before T.D.C., as indicated on Gauge. On engines with aluminum heads and type SL-9 spark plugs (high compression head), stop when .014 inch before T.D.C.

Spark Plugs—14-MM (AC type S-9) iron alloy head; 14-MM (AC type SL-9) aluminum head.

NOTE: These are new type plugs with a fixed gap of .025 inch, which cannot be changed or adjusted. The S-9 plug has a threaded length of 3/8 inches, while the SL-9 is 7/16 inches. The plugs are not interchangeable. Use only a piano-wire type of thickness gauge when checking gaps. If out of adjustment replace with a new AC plug of same type.

Firing Order—1-5-3-6-2-4.

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
630	315		1
800	400		3
1160	580		6
1700	850		10
2400 (Max.)	1200		

Coil and Lock Switch Assembly—Delco-Remy, 540-A.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 937-G, (Belt Drive)

Performance Data—Gen. cold. No thermostat.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	16	1650	8.
5	850	7.1	18	1850 (Max.)	8.2
12	1250	7.8	17	2000	8.3

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—3 1/2 amps. at 6 volts, across field coils in series.

Brush Spring Tension—14 to 18 oz. on each (new brushes).

Armature—Delco-Remy, 817221.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Clum, No. 13786.

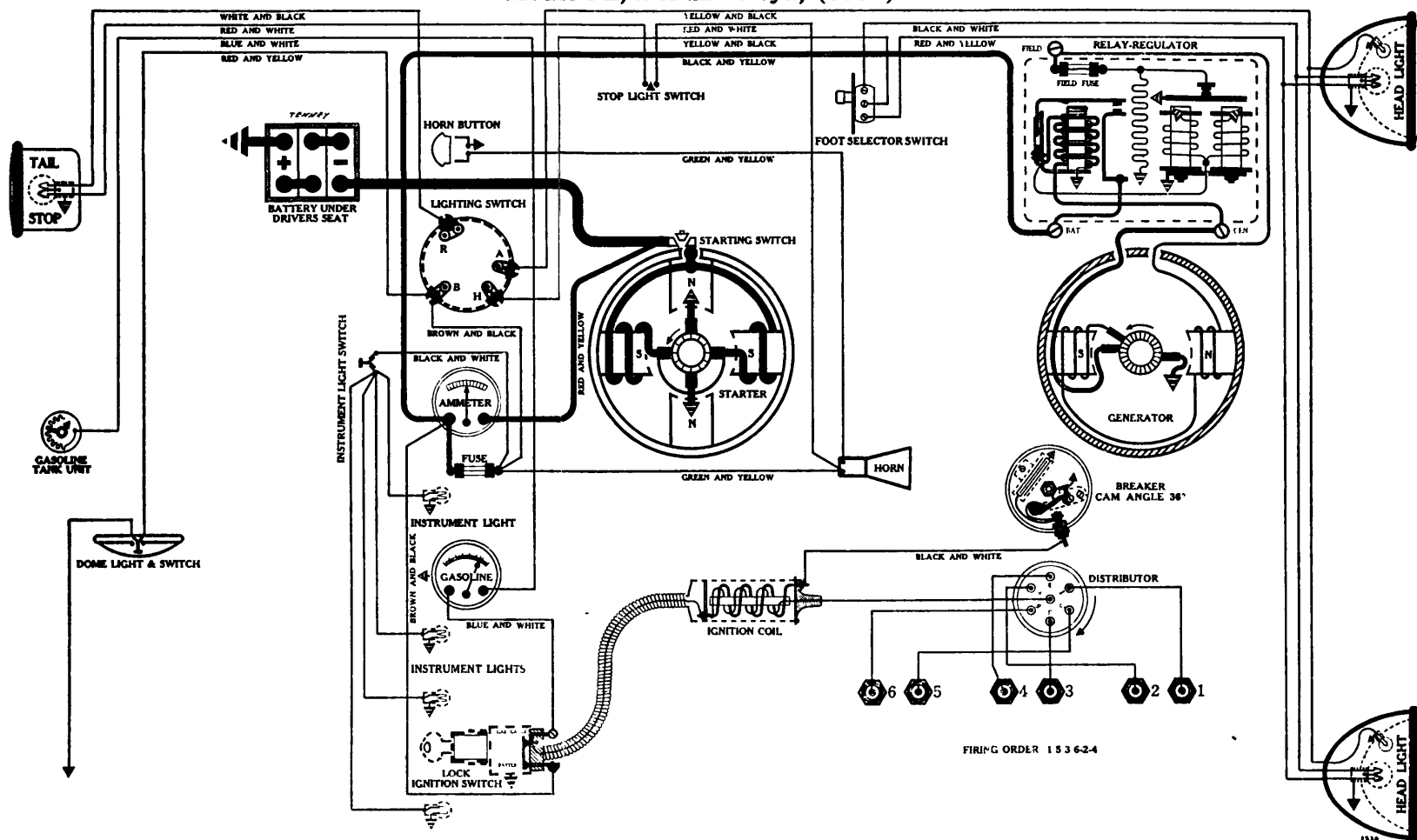
Location—Behind instrument board.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on back of ammeter.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; PARK—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

PLYMOUTH

Model PE, DeLux 6 cyl., (1934)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—105 amps. for 20 minutes.

Lighting Capacity—4.3 amps. for 20 hours (86 amp. hour).

Box—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 734-H

Connection to Engine—Mechanical pinion shift incorporating disc clutch. Initial movement of gear shifting lever causes pinion to engage flywheel. Further movement of lever closes switch on motor.

Running Free—65 amp. at 5 volts, 5000 R.P.M.

Cranking Engine—165 to 180 amps. at 4.2 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 644-K

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 36 degrees; open 24 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. On engines with an iron alloy head and type S-9 spark plugs (standard head), stop when the "zero" mark on the vibration dampener (which is exact T.D.C.) has moved three graduations past the pointer on gear case cover. On engines with an aluminum head and type SL-9 spark plugs (high compression head) stop when zero mark on dampener has moved six graduations past the pointer.

Timing with MOTOR GAUGE—Remove the 1/8 inch pipe plug (located above No. 6 piston), and attach MOTOR GAUGE, using adapter No. 103 and rod No. 12, or remove No. 1 spark plug and attach Gauge, using adapter No. 114 and rod No. 2 (iron head) or rod No. 42 (aluminum head). Slowly turn engine until No. 1 piston is coming up on compression stroke. On engines with an iron alloy head continue to turn until piston starts down on power stroke. Stop when .004 inch after T.D.C., as indicated on Gauge. On engines with an aluminum head continue to turn until piston starts down on power stroke, but stop when .014 inch after T.D.C.

Spark Plugs—14-MM (AC type S-9) iron alloy head; 14-MM (AC type SL-9) aluminum head.

NOTE: These are new type plugs with a fixed gap of .025 inch, which cannot be changed or adjusted. The S-9 plug has a threaded length of 3/8 inches, while the SL-9 is 7/16 inches. The plugs are not interchangeable. Use only a piano-wire type of thickness gauge when checking gaps. If out of adjustment replace with a new AC plug of same type.

Firing Order—1-5-3-6-2-4.

Automatic Advance—16 degrees (Distributor).

Eng. R.P.M.

Dist. R.P.M.

Degrees Advance (Dist.)

400	200	Start
500	250	2
600	300	4
800 (Intermediate)	400	7 1/2
1270	635	10
2020	1010	14
2400 (Max.)	1200	16

Coil and Lock Switch Assembly—Delco-Remy, 540-A.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 937-P, (Belt Drive)

Performance Data—Gen. cold. Field lead grounded.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	15	1300	7.8
5	950	6.8	20	1600	8.3
10	1100	7.2	22	2400 (Max.)	8.4

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 5.6 volts.

Field Test—3 1/2 amps. at 6 volts across field coils in series.

Field Fuse—6 amp. (Type 3A-6) in regulator box.

Brush Spring Tension—22 to 26 oz. on main; 16 to 20 on third (new brushes).

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY-REGULATOR

Delco-Remy, 5540

A combination of Cut-Out Relay and Voltage Operated Two Stage Lock-Out Regulator

Cut-Out Relay: Closes—7 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

Regulator: Core Gap—.038 inch (armature down).

Contact Opening—.008 to .013 inch (armature down).

Spring Tension—3/4 oz. (measured at contact).

Gap between Stop and Fiber Bumper—.028 inch (armature released).

LIGHTING

Switch—Plymouth, No. 619728.

Location—Behind instrument board.

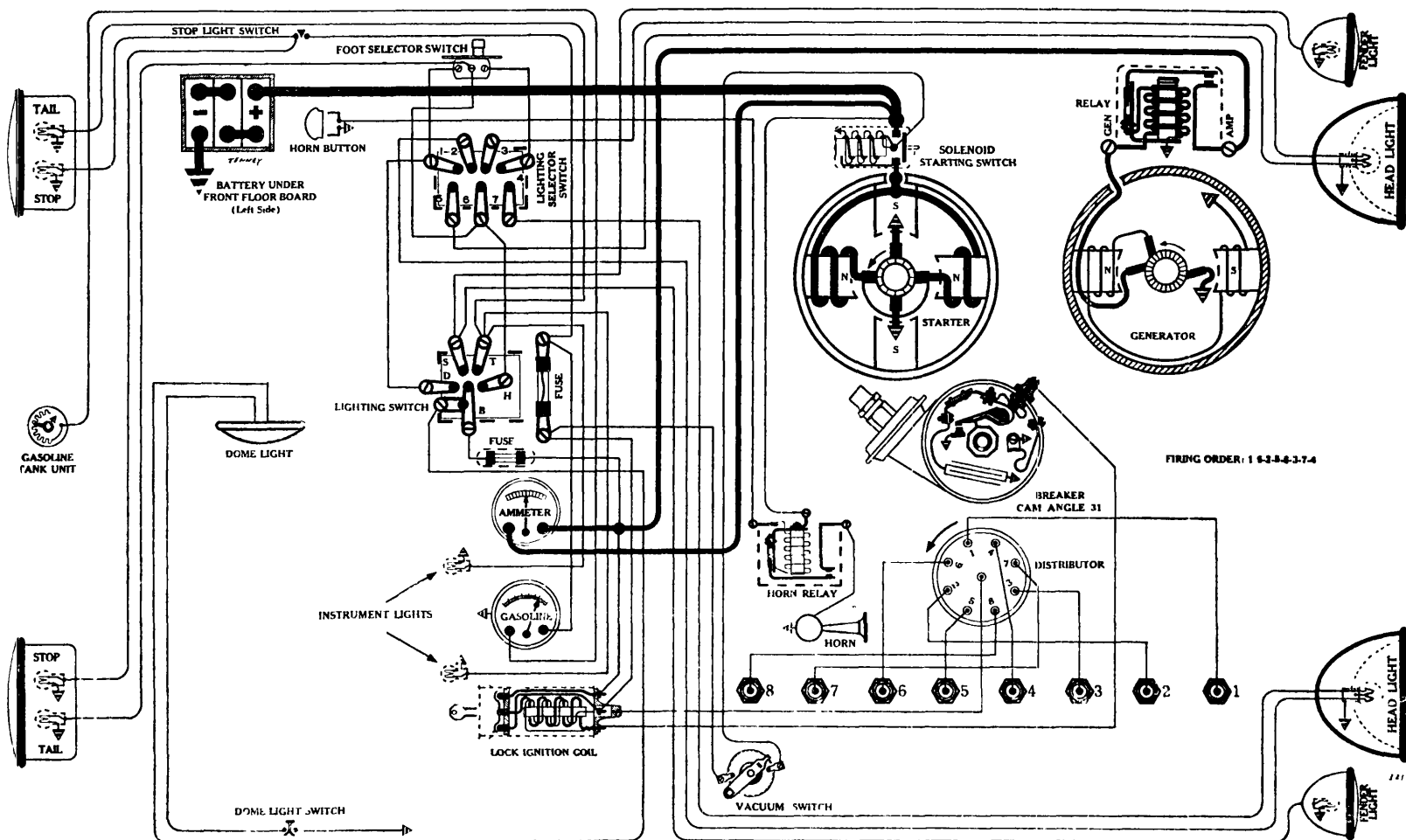
Fuses—Single 20 amp. fuse (type 3A-20), mounted on back of ammeter.

Foot Selector Switch—Delco-Remy, 465-Z.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; PARK—63; INSTRUMENT—63; DOME—87; STOP AND TAIL—1158.

PONTIAC

Model 603, Straight Eight, (Early 1934)



BATTERY

Delco-Remy, 17-G, 6 volts. Negative Terminal Grounded
Starting Capacity—131 amps. for 20 minutes.
Lighting Capacity—5.35 amps. for 20 hours (107 amp. hour).
Box—Length, 10 $\frac{3}{8}$; width, 7; height, 8 $\frac{5}{8}$ inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 734-W

Connection to Engine—Bendix Drive, Type A-1674.
Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—210 to 225 amps. at 4.1 volts.
Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each (new brushes).
Starting Switch—Delco-Remy Solenoid 1503.
Vacuum Starting Control Switch—Delco-Remy, 1588.
Armature—Delco-Remy, 1847432.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 663-B

(Full Automatic Spark Advance in conjunction with Vacuum Operated Advance, which controls position of breaker mounting plate)
Breaker—Contact separation .015 inch.
Cam Angles—Points closed 31 degrees; open 14 degrees.
Contact Spring Tension—19 to 23 oz.
Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when first flywheel mark "Ign 1 & 8" is in line with pointer on flywheel housing. (NOTE: There are two 1 & 8 ignition marks on flywheel. The first mark is 9 degrees before T.D.C., and the second mark 4 degrees before T.D.C. The recommended setting is by the first mark, to compensate for wear.) With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .004 inch (new cars driven less than 1500 miles), or .025 inch (cars with greater mileage) before T.D.C., as indicated on Gauge.
Spark Plugs—14-MM (AC type K-7); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Automatic Advance—11 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
340	170	Start
680	340	2
1200 (Intermediate)	600	5
2300	1150	8
3400 (Max.)	1700	11

Lock Ignition Coil—Delco-Remy, 539-Z.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 935-C, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
2	700	6.4	10	1000	7.1
4	750	6.5	12	1100	7.3
5	800	6.6	15	1400	7.5
7	850	6.8	17	2000	7.8
8	900	6.9	19	2400 (Max.)	8.

Motoring Freely—4 amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—2.3 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-H

Closes—7 to 7 $\frac{1}{2}$ volts.

Opens—0 to 2 $\frac{1}{2}$ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-W.

Location—Behind instrument board.

Instrument Board Lighting Selector Switch—Delco-Remy, 1384.

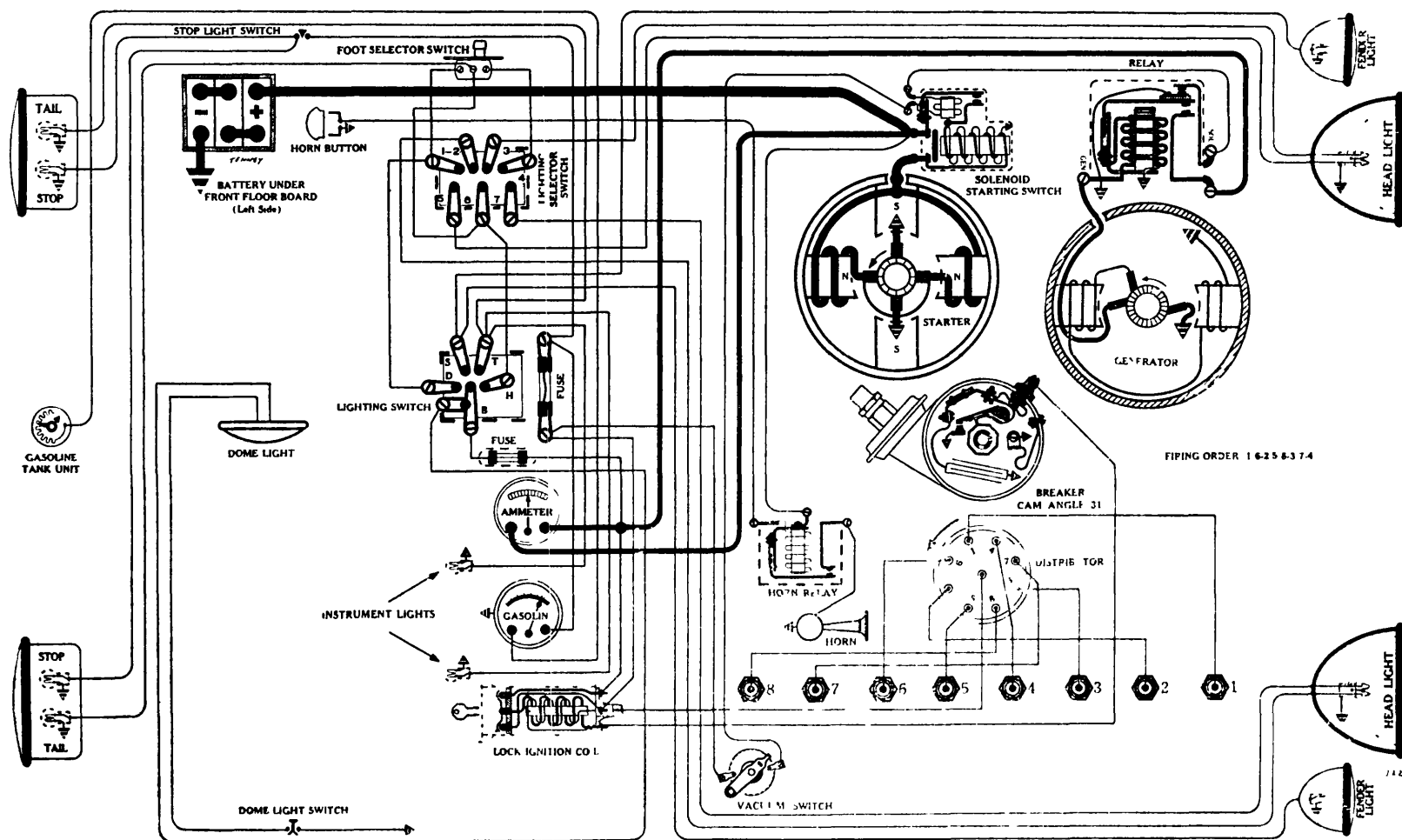
Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch. (Protects gas gauge and stop light circuits). Single 20 amp. fuse (type 3A-20) in fuse holder on wire, which connects ammeter to "B" terminal on lighting switch.

Foot Selector Switch—Delco-Remy, 465-Z.

Lamps—See Lamp Table, Sec. AA. HEAD—2320-C*; FENDER—63; INSTRUMENT—63; DOME—81; STOP—68; TAIL—63. A new type bulb.

PONTIAC

Model 603, Straight Eight, (Late 1934)



BATTERY

Delco-Remy, 17-G, 6 volts. Negative Terminal Grounded
Starting Capacity—131 amps. for 20 minutes.
Lighting Capacity—5.35 amps. for 20 hours (107 amp. hour).
Box—Length, 10%; width, 7; height, 8% inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 738-B

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch, remote control relay (located in solenoid unit), and an auxiliary set of grounding points found on cut-out relay.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—175 to 190 amps. at 4.1 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy Solenoid, 1516.

Vacuum Starting Control Switch—Delco-Remy, 1588.

Armature—Delco-Remy, 823881.

IGNITION

Rotation, L. H., Top View
Delco-Remy, 663-B

(Full Automatic Spark Advance in conjunction with Vacuum Operated Advance, which controls position of breaker mounting plate)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when first flywheel mark "Ign 1 & 8" is in line with pointer on flywheel housing. (NOTE: There are two 1 & 8 ignition marks on flywheel. The first mark is 9 degrees before T.D.C., and the second mark 4 degrees before T.D.C. The recommended setting is by the first mark, to compensate for wear.) With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .004 inch (new cars driven less than 1500 miles), or .025 inch (cars with greater mileage) before T.D.C., as indicated on Gauge.

Spark Plugs—14-MM (AC type K-7); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—11 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
340	170		2
680	340		5
1200 (Intermediate)	600		8
2300	1150		11
3400 (Max.)	1700		

Lock Ignition Coil—Delco-Remy, 539-Z.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 935-C, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
2	700	6.4	10	1000	7.1
4	750	6.5	12	1100	7.3
5	800	6.6	15	1400	7.5
7	850	6.8	17	2000	7.8
8	900	6.9	19	2400 (Max.)	8.

Motoring Freely—4 amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—2.3 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAYS

Cut-Out Relay, Delco-Remy, 265-T

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-W.

Location—Behind instrument board.

Instrument Board Lighting Selector Switch—Delco-Remy, 1384.

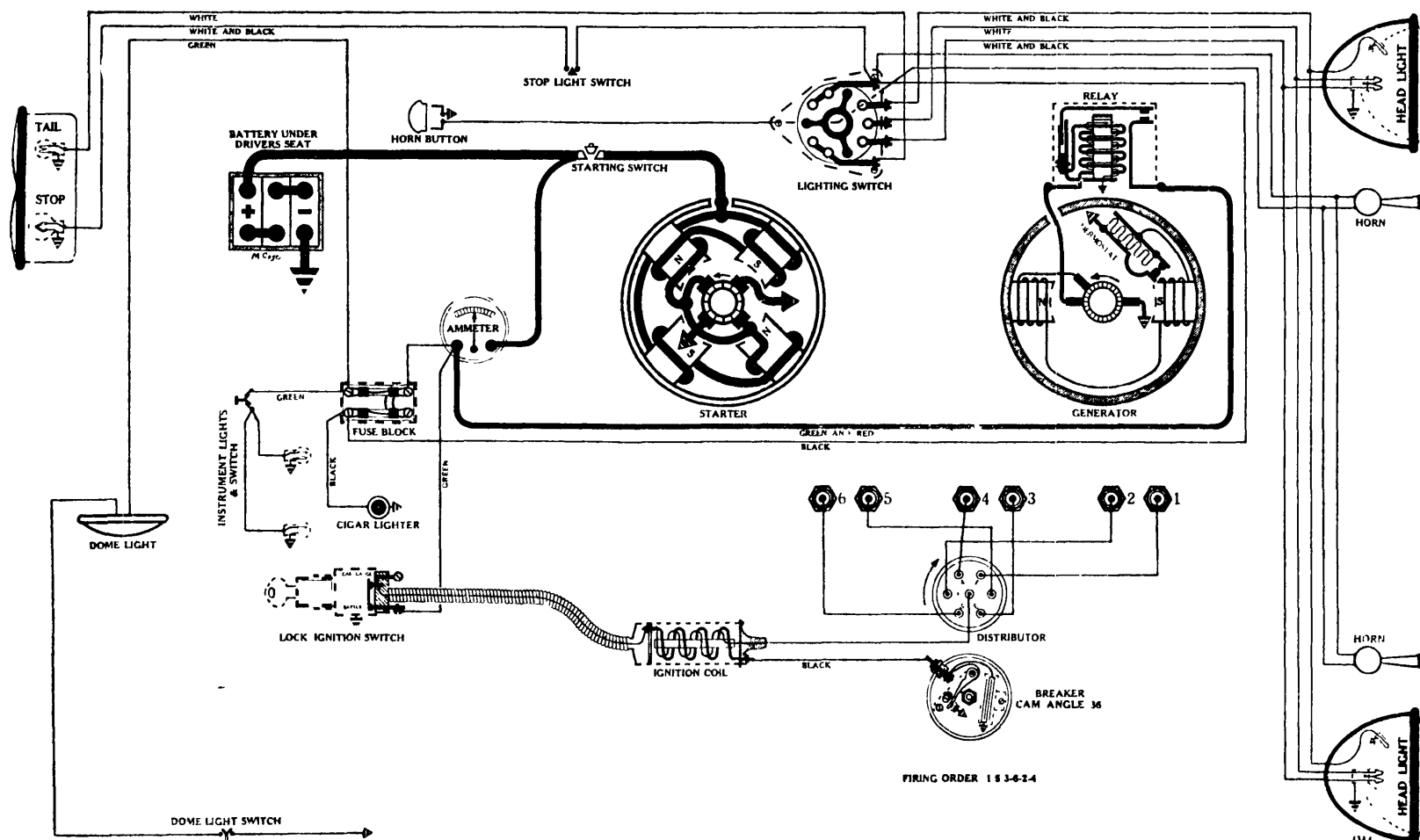
Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch. (Protects gas gauge and stop light circuits). Single 20 amp. fuse (type 3A-20) in fuse holder on wire, which connects ammeter to "B" terminal on lighting switch.

Foot Selector Switch—Delco-Remy, 465-Z.

Lamps—See Lamp Table, Sec. AA. HEAD—2320-C*; FENDER—63; INSTRUMENT—63; DOME—81; STOP—63; TAIL—63. A new type bulb.

REO

Mod 1 4S-34, Flying Cloud, 6 cyl., (1934)



BATTERY

Willard, WH-13, 6 volts. Negative Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Lighting Capacity—5.1 amps. for 20 hours (102 amp. hour).

Box—Length, 9-1/16; height, 7-1/16; width, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End

Delco-Remy, 736-G

Connection to Engine—Bendix Drive, Type RCD11FX-10.

Running Free—65 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—160 to 180 amps. at 4½ volts.

Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Clutch Pedal Operated.

Armature—Delco-Remy, 818002.

IGNITION

Rotation, R. H., Top View

Delco-Remy, 644-M

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 36 degrees; open 24 degrees.

Contact Spring Tension—17 to 21 oz.

Timing—IMPORTANT! Time ignition in full advance position. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the line on flywheel (found ¾ inch or 2 full teeth ahead of flywheel mark "UDC") is opposite reference line on flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug, and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .012 inch (for straight run gasoline) or .048 inch (for Ethyl gasoline) before T.D.C., as indicated on Gauge.

Spark Plugs—18-MM (Champion type C-7); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Manual Advance—12½ degrees (Distributor).

Automatic Advance—9 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
320	160	Start
600	300	1
1460	730	4
2040	1020	6
2600	1300	8
2900 (Max.)	1450	9

Coil and Lock Switch Assembly—Delco-Remy, 538-B.

GENERATOR

Rotation, L. H., Com. End

Delco-Remy, 955-R, (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	11	1000	7.9
3	700	7.1	15	1200	8.1
6	800	7.1	20	1450 (Max.)	8.3

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 amps. at 6 volts across field coils in series.

Brush Spring Tension—16 to 18 oz. on each (new brushes).

Armature—Delco-Remy, 817807.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-G

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-X.

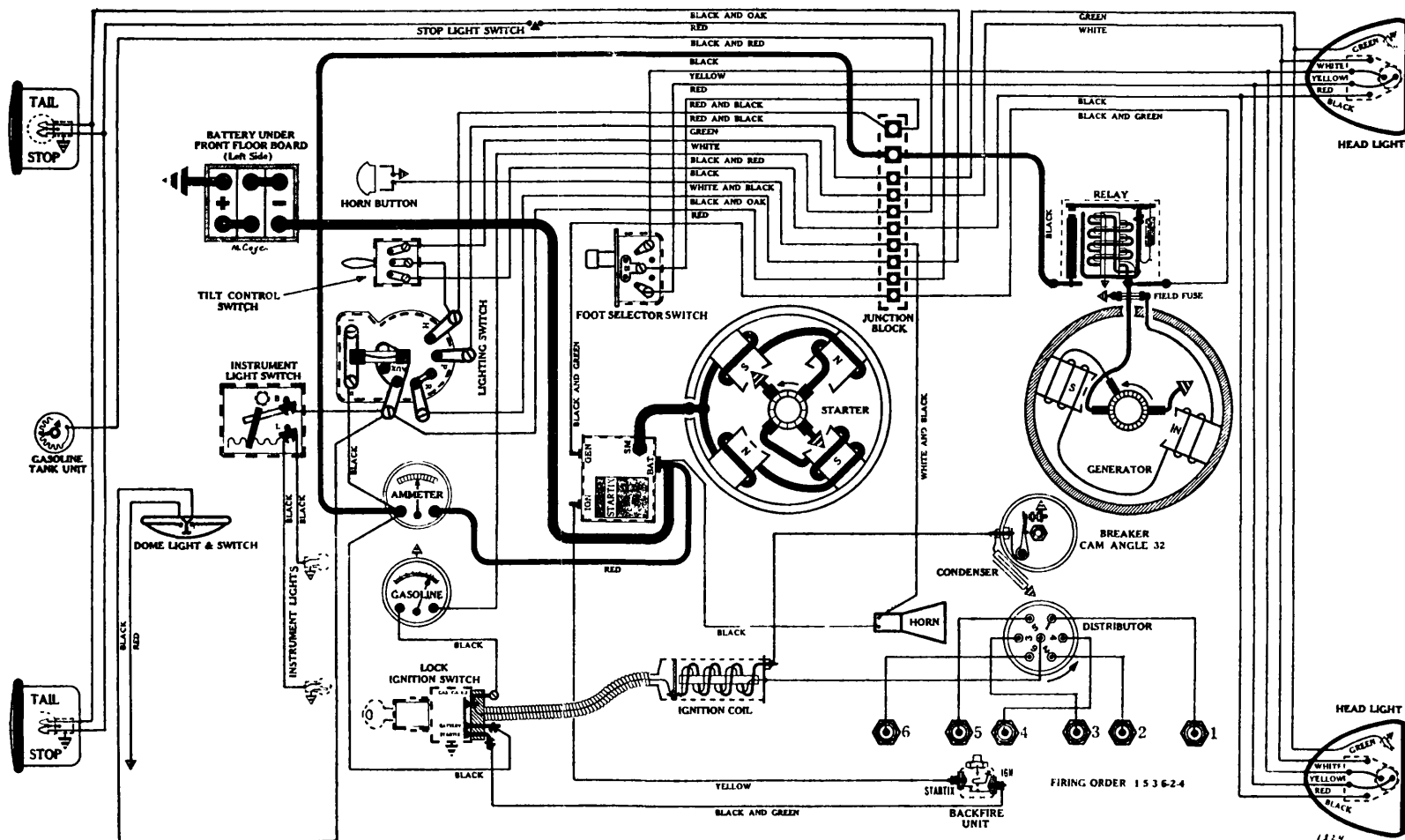
Location—Foot of steering column.

Fuses—Two 20 amp. fuses (type 3A-20), mounted on fuse block behind instrument board.

Lamps—See Lamp Table, Sec. AA. HEAD—1116; PARK—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

STUDEBAKER

Model A, Dictator, 6 cyl., (1934)



BATTERY

Willard, WH-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.
Lighting Capacity—5.1 amps. for 20 hours (102 amp. hour).
Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAN-4002

Connection to Engine—Bendix Drive, Type RCD10FXD-9.
Running Free—65 amps. at 5½ volts, 4000 R.P.M.
Cranking Engine—200 to 220 amps. at 4.9 volts.
Lock Torque—15½ pound-feet, 580 amps. at 3 volts.
Brush Spring Tension—44 to 56 oz. on each (new brushes).
Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.
Armature—Auto-Lite, MAD-2083.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGB-4393

(Full Automatic Spark Advance in conjunction with Auto-Lite, Type VC-4001 Vacuum Spark Advance)

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 32 degrees; open 28 degrees.
Contact Spring Tension—17 to 19 oz.
Timing—With No. 1 piston on compression stroke, bring flywheel mark "UDC 1-6" directly in line with pointer in flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C., as indicated on Gauge.
Spark Plugs—18-MM (Champion type 7); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Vacuum Advance—7½ degrees (Distributor).
Automatic Advance—10½ degrees (Distributor).

Eng. R.P.M.

Dist. R.P.M.

Degrees Advance (Dist.)

800	400	Start
1000	500	2
1200	600	4
1400 (Intermediate)	700	6
2340	1170	9
2800 (Max.)	1400	10½

Coil and Lock Switch Assembly—Auto-Lite, IG-4607.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAM-4601, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	675	6.2	12	1320	7.3
4	825	6.5	16	1850	7.8
8	975	7.	18	2400 (Max.)	8.

Motoring Freely—5 amps. at 6 volts.
Max. Stall Current—23 to 25 amps. at 6 volts.
Field Test—4½ amps. at 6 volts across field coils in series.
Field Fuse—7½ amps. (Type 1A-7½).
Brush Spring Tension—18 to 22 oz. on each (new brushes).
Armature—Auto-Lite, GAM-2055.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021-S

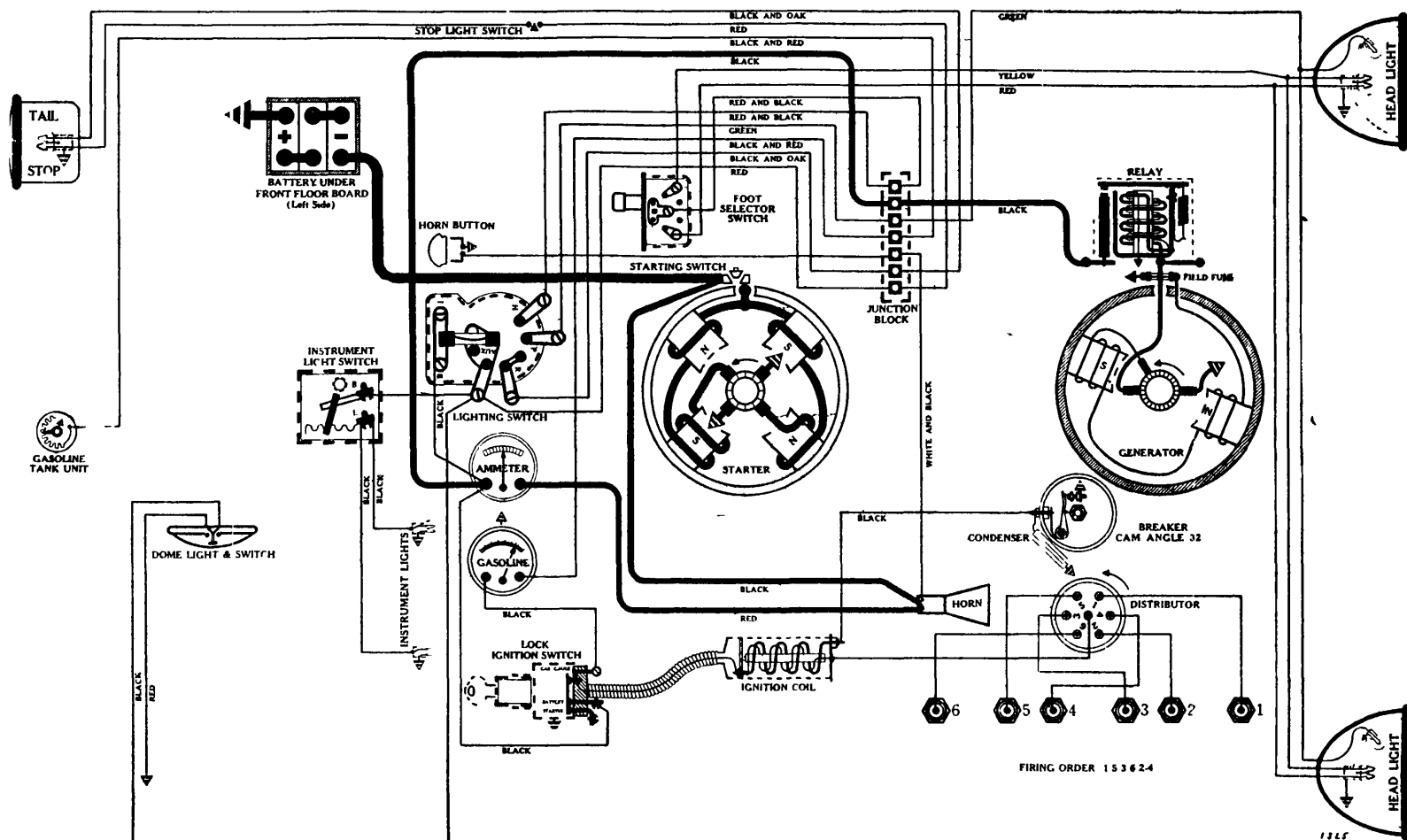
Closes—6¼ to 7½ volts.
Opens—½ to 2½ amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .020 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9236.
Location—Behind instrument board.
Instrument Light Dimming Switch—Clum, No. 13652.
Tilt Control Switch—Located on instrument board. (For complete details of operation see "1934 Control Beam Head Lights", Sec. AA.)
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.
Foot Selector Switch—Clum, No. 9505.
Lamps—See Lamp Table, Sec. AA. HEAD—1000; PARK—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

STUDEBAKER

Mod 1 D, Dictator, 6 cyl., (1934)



BATTERY

Willard, WH-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Lighting Capacity—51 amps. for 20 hours (102 amp. hour).

Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAN-4005

Connection to Engine—Bendix Drive, Type RCD10FXD-9.

Running Free—65 amps. at 5½ volts, 4000 R.P.M.

Cranking Engine—200 to 220 amps. at 4.9 volts.

Lock Torque—15 pound-feet, 580 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-3737-S, mounted on starter.

Switch should not close with less than 2.3 lbs. pull applied at right angles to hole in extreme end of lever.

Armature—Auto-Lite, MAD-2083.

IGNITION

Rotation, L. H., Top View
Auto-Lite, IGB-4393

(Full Automatic Spark Advance in conjunction with Auto-Lite, Type VC-4001 Vacuum Spark Advance)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 32 degrees; open 28 degrees.

Contact Spring Tension—17 to 19 oz.

Timing—With No. 1 piston on compression stroke, bring flywheel mark "UDC 1-6" directly in line with pointer in flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C., as indicated on Gauge.

Spark Plugs—18-MM (Champion type 7); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance—7½ degrees (Distributor).

Automatic Advance—10½ degrees (Distributor).

Eng. R.P.M.

Dist. R.P.M.

Degrees Advance (Dist.)

800	400	Start
1000	500	2
1200	600	4
1400 (Intermediate)	700	6
2340	1170	9
2800 (Max.)	1400	10½

Coil and Lock Switch Assembly—Auto-Lite, IG-4607.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAM-4601, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	675	6.2	12	1320	7.3
4	825	6.5	16	1850	7.8
8	975	7.	18	2400 (Max.)	8.

Motoring Freely—5 amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 6 volts.

Field Test—4½ amps. at 6 volts across field coils in series.

Field Fuse—7½ amps. (Type 1A-7½).

Brush Spring Tension—18 to 22 oz. on each (new brushes).

Armature—Auto-Lite, GAM-2055.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021-S

Closes—6¼ to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .020 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9236.

Location—Behind instrument board.

Instrument Light Dimming Switch—Clum, No. 13652.

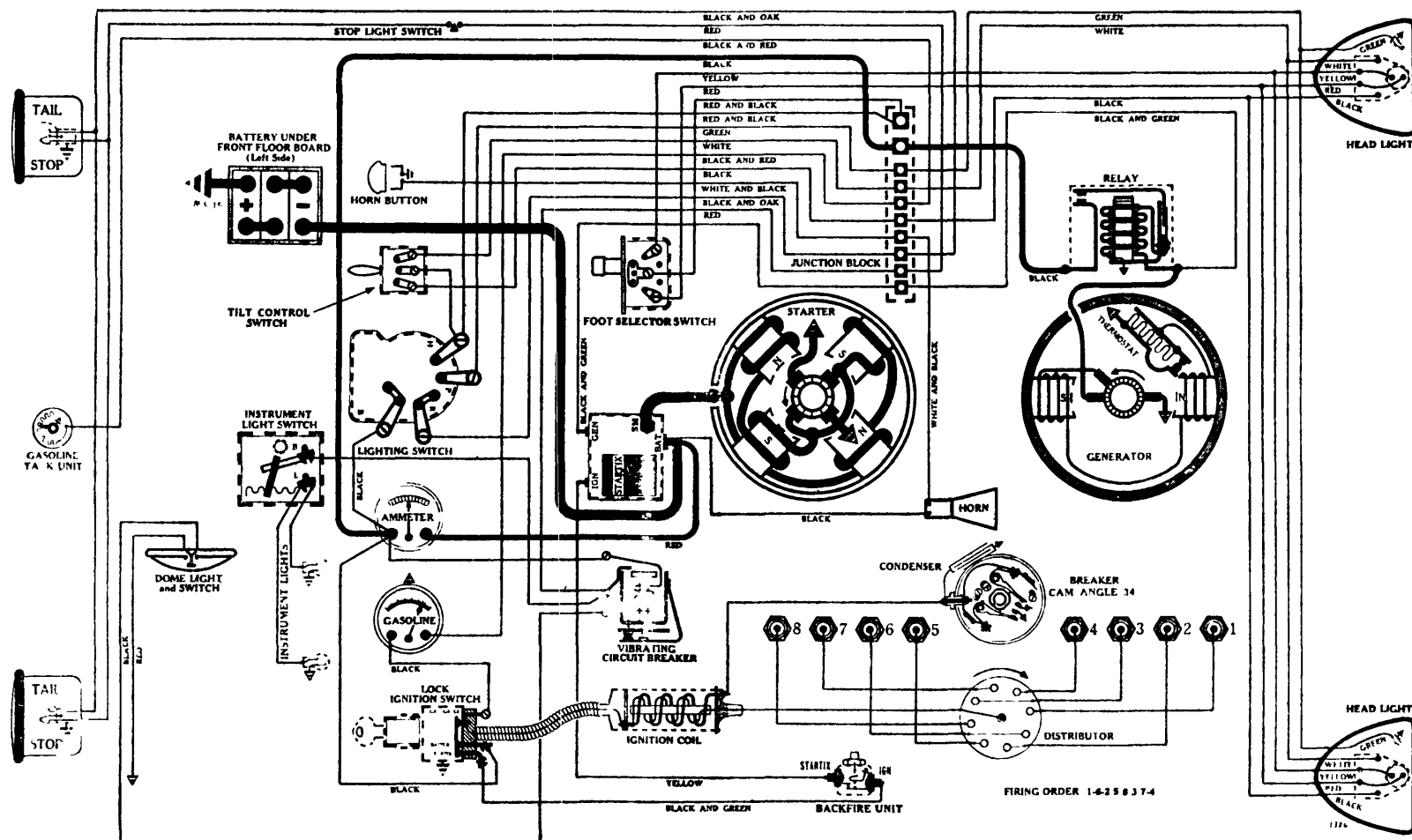
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.

Foot Selector Switch—Clum, No. 9505.

Lamps—See Lamp Table, Sec. AA. HEAD—1000; PARK—63; INSTRUMENT—63; DOME—31; STOP AND TAIL—1158.

STUDEBAKER

Mod 1 B, Command r, Straight Eight, (1934)



BATTERY

Willard, WH-1-13, 6 volts. Positive Terminal Grounded
Starting Capacity—120 amps. for 20 minutes.
Lighting Capacity—5.1 amps. for 20 hours (102 amp. hour).
Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 736-H

Connection to Engine—Bendix Drive, Type RCD10FXD-9.
Running Free—65 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—160 to 175 amps. at 3.3 volts.
Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
Brush Spring Tension—32 to 36 oz. on each (new brushes).
Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.
Armature—Delco-Remy, 1838663.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 662-M

(Semi-Automatic Spark Advance in conjunction with Delco-Remy, 680-J Vacuum Control)
Breakers—Contact separation .020 inch.
Cam Angles—Points closed 34 degrees; open 56 degrees (each breaker separately). Points closed 34 degrees; open 11 degrees (both together).
Contact Spring Tension—17 to 21 oz.
Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.
Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke, bring flywheel mark "UDC 1-8" directly under pointer on the right side of the flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C., as indicated on Gauge.
Spark Plugs—18-MM (Champion type 7); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—12½ degrees (Distributor).
Vacuum Advance—3 degrees (Distributor).
Automatic Advance—14½ degrees (Distributor).

Eng. R.P.M.

320
770
1000
1900
3500
3600 (Max.)

Dist. R.P.M.

160
385
500
950
1750
1800

Degrees Advance (Dist.)

Start
2
3
7
14
14½

Coil and Lock Switch Assembly—Delco-Remy, 538-A.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-C, (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	11	1000	7.9
3	700	7.	15	1200	8.1
6	800	7.1	20	1450 (Max.)	9.3

NOTE: Thermostat opens about 165° F., reducing charging rate approx 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4 amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each (new brushes).

Armature—Delco-Remy, 820370.

Third Brush Adjustment—Loosen cover band. See Fig. 22, "Third Brush Adjustment" page, Sec. AA.

RELAY

Delco-Remy, 265-B

Closes—7 to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9498.

Location—Behind instrument board.

Instrument Light Dimming Switch—Clum, No. 13652.

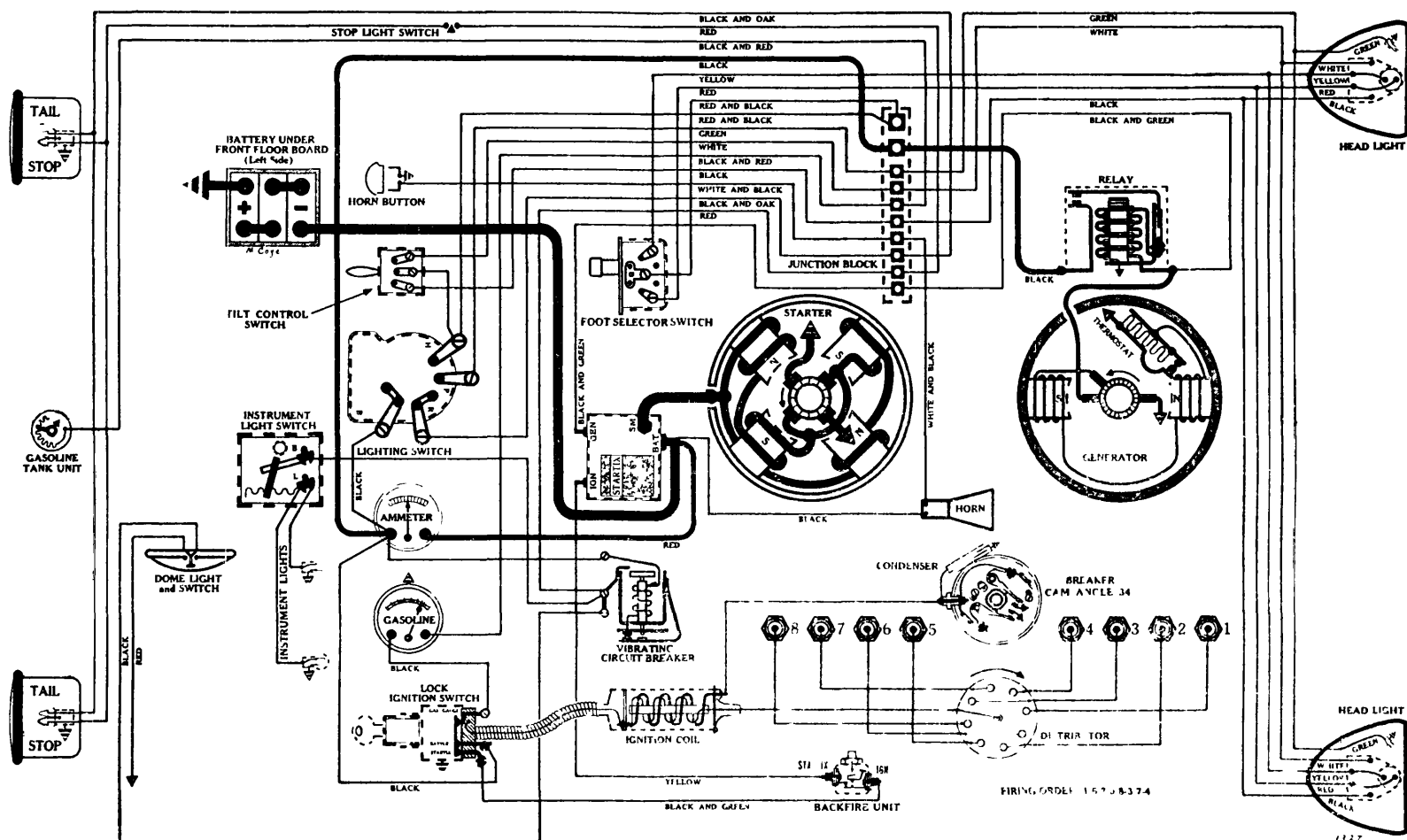
Tilt Control Switch—Located on instrument board. (For complete details of operation see "1934 Control Beam Head Lights", Sec. AA.)

Vibrating Circuit Breaker—Delco-Remy, 410-L. Starts 25 to 30 amps. Operates 10 to 15 amps.

Lamps—See Lamp Table, Sec. AA. HEAD—1000; PARK—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

STUDEBAKER

Model C, President, Straight Eight, (1934)



BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded
Starting Capacity—160 amps. for 20 minutes.
Lighting Capacity—6.8 amps. for 20 hours (136 amp. hour).
Box—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Delco-Remy, 736-H

Connection to Engine—Bendix Drive, Type RCD10FXD-9.
Running Free—65 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—160 to 175 amps. at 3.3 volts.
Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
Brush Spring Tension—32 to 36 oz. on each (new brushes).
Starting Switch—“Startix”, type D, Automatic Starting Switch and Anti-Stall Device.
Armature—Delco-Remy, 1838663.

IGNITION

Rotation, R. H., Top View
Delco-Remy, 662-M

(Semi-Automatic Spark Advance in conjunction with Delco-Remy, 680-J Vacuum Control)

Breakers—Contact separation .020 inch.
Cam Angles—Points closed 34 degrees; open 56 degrees (each breaker separately). Points closed 34 degrees; open 11 degrees (both together).
Contact Spring Tension—17 to 21 oz.
Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.
Timing—IMPORTANT! Time ignition in full advance position. With No. 1 piston on compression stroke, bring flywheel mark “UDC 1-8” directly under pointer on the right side of the flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 2. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when piston reaches exact T.D.C., as indicated on Gauge.
Spark Plugs—18-MM (Champion type 7); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Manual Advance—12½ degrees (Distributor).
Vacuum Advance—3 degrees (Distributor).
Automatic Advance—14½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
320	160	Start
770	385	2
1000	500	3
1900	950	7
3500	1750	14
3600 (Max.)	1800	14½

Coil and Lock Switch Assembly—Delco-Remy, 538-A.

GENERATOR

Rotation, L. H., Com. End
Delco-Remy, 955-C, (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.					
Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	11	1000	7.9
3	700	7.1	15	1200	8.1
6	800	7.1	20	1450 (Max.)	9.3

NOTE: Thermostat opens about 165° F, reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.
Max. Stall Current—18 to 20 amps. at 6 volts.
Field Test—4 amps. at 6 volts across field coils in series.
Brush Spring Tension—14 to 18 oz. on each (new brushes).
Armature—Delco-Remy, 820370.
Third Brush Adjustment—Loosen cover band. See Fig. 22, “Third Brush Adjustment” page, Sec. AA.

RELAY

Delco-Remy, 265-C

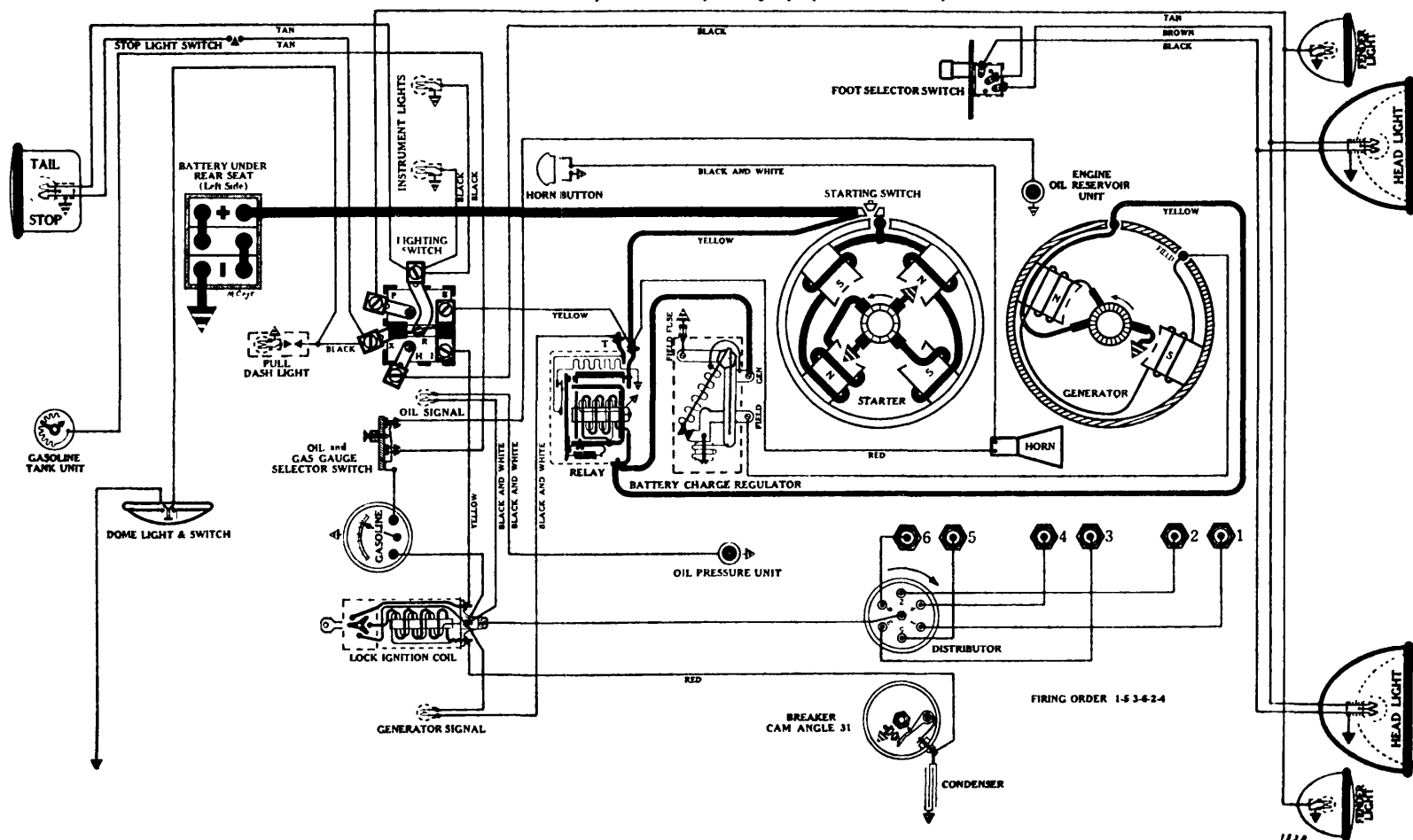
Closes—7 to 7½ volts.
Opens—0 to 2½ amps. discharge.
Contact Gap—.015 to .025 inch.
Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9498.
Location—Behind instrument board.
Instrument Light Dimming Switch—Clum, No. 13652.
Tilt Control Switch—Located on instrument board. (For complete details of operation see “1934 Control Beam Head Lights”, Sec. AA.)
Vibrating Circuit Breaker—Delco-Remy, 410-L. Starts 25 to 30 amps. Operates 10 to 15 amps.
Lamps—See Lamp Table, Sec. AA. HEAD—1000; PARK—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

TERRAPLANE

Model KU, D Luxe, 6 cyl., (Late 1933)



BATTERY

National, H3-13-X, 6 volts. Negative Terminal Grounded

Starting Capacity—102 amps. for 20 minutes.

Lighting Capacity—4.3 amps. for 20 hours (86 amp. hour).

Box—Length, 9½; width, 7½; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite, MAJ-4031

Connection to Engine—Bendix Drive, Type A-1588.

Running Free—67 amps. at 5½ volts, 4100 R.P.M.

Cranking Engine—165 amps. at 4.9 volts, 230 R.P.M.

Lock Torque—12 pound-feet, 550 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (new brushes).

Starting Switch—Auto-Lite, MU-2208-S, mounted on starter.

Switch should not close with less than 7½ lbs. pull, applied at right angles to hole in end of lever.

Armature—Auto-Lite, MAJ-2055.

IGNITION

Rotation, R. H., Top View

Auto-Lite, IGB-4074-A

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 31 degrees; open 29 degrees.

Contact Spring Tension—17 to 19 oz.

Timing—With No. 1 piston on compression stroke, slowly turn engine (using wrench on starter armature extension) until flywheel mark "UDC 1-6" is opposite pointer cast in flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston reaches exact T.D.C. (compression stroke), as indicated on Gauge.

Spark Plugs—14-MM (Champion type J-7); Gap .020 to .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
800	400	Start
1460	730	3
2100	1050	6
3160	1580	11
4000 (Max.)	2000	15

Lock Ignition Coil—Auto-Lite, IG-4308.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBK-4602, (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	775	6.2	10	1175	7.1
2	850	6.3	12	1280	7.3
4	925	6.5	16	1450	7.6
6	975	6.7	18	1850	7.8
8	1085	7.	22	2400 (Max.)	8.3

Motoring Freely—5 amps. at 6 volts.

Max. Stall Current—25 to 28 amps. at 5½ volts.

Field Test—3.9 amps. at 6 volts across field coils in series.

Field Fuse—7½ amp. (Type 1A-7½) in regulator unit.

Brush Spring Tension—18 to 22 oz. on each (new brushes).

Armature—Auto-Lite, GBK-2055.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAYS

Cut-Out Relay, Auto-Lite, CBA-4002

Closes—6¾ to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .020 inch, contacts closed.

Charge Regulator—Auto-Lite, XA-414-S

NOTE: For special instructions on theory of operation and how to service regulator, see "Charge Regulator" page, Sec. AA.

LIGHTING

Switch—Soreng-Manegold, No. B-5670-A.

Location—Behind instrument board.

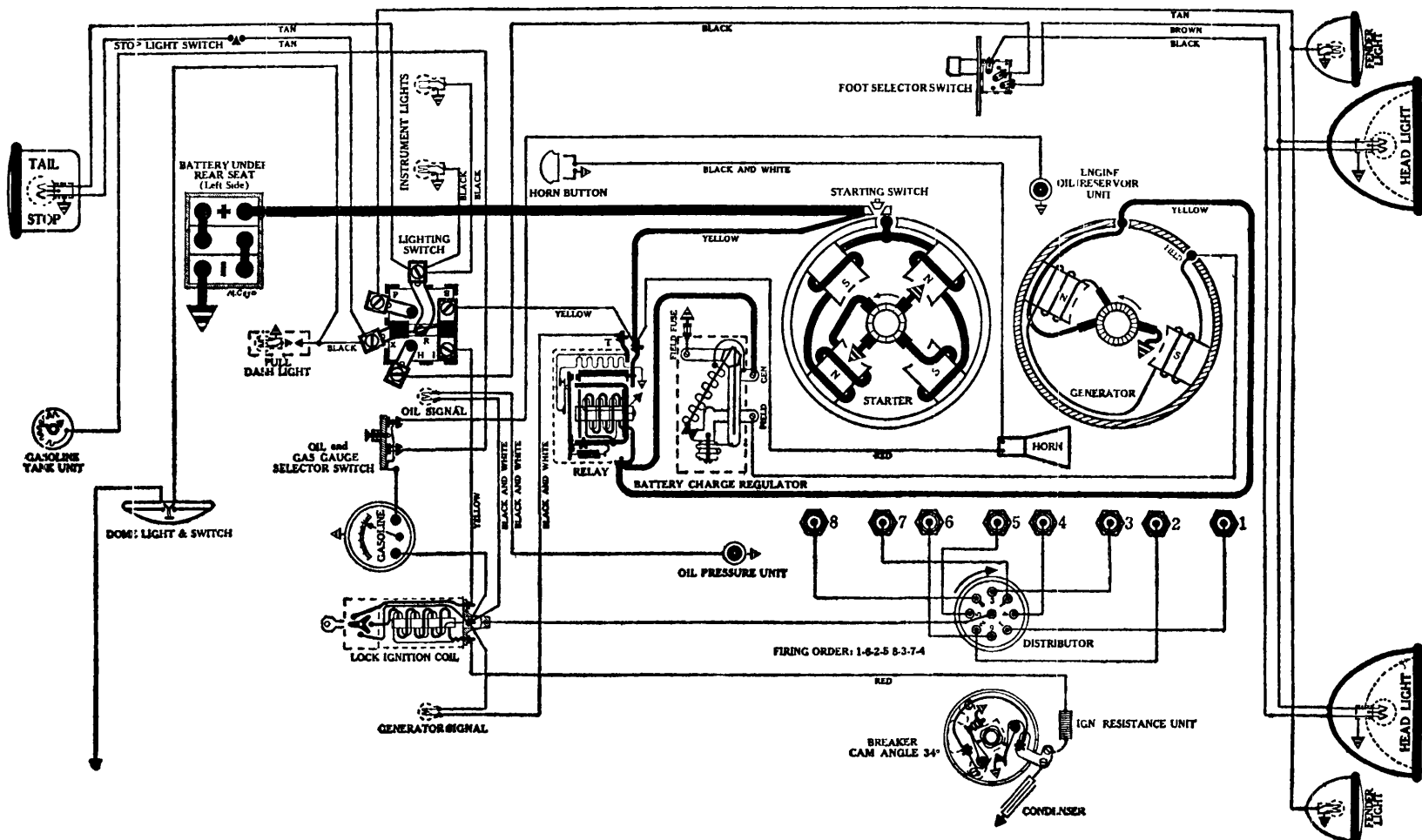
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.

Foot Selector Switch—Soreng-Manegold, No. C-2100-A.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; FENDER—63; INSTRUMENT—63; SIGNALS—64; DOME—87; STOP AND TAIL—1158.

TERRAPLANE

Model KT, DeLux Straight Eight, (Late 1933)



BATTERY

Exide, 3-VXA-15-1, 6 volts. Negative Terminal Grounded
Starting Capacity—122 amps. for 20 minutes.
Lighting Capacity—5.1 amps. for 20 hours (102 amp. hour).
Box—Length, 10-9/32; width, 7; height, 9-5/32 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4052

Connection to Engine—Bendix Drive, Type A-1588.
Running Free—60 amps. at 5½ volts, 3700 R.P.M.
Cranking Engine—275 to 300 amps. at 4.3 volts.
Lock Torque—15½ pound feet, 582 amps. at 3 volts.
Brush Spring Tension—14 to 56 oz. on each (new brushes).
Starting Switch—Auto-Lite, MU-2208-S, mounted on starter.
Switch should not close with less than 7½ lbs. pull, applied at right angles to hole in end of lever.
Armature—Auto-Lite, MAB-2101.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGH-4024-A
(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch on each.
Cam Angles—Points closed 34 degrees; open 56 degrees (each breaker separately). Points closed 34 degrees; open 11 degrees (both together).
Contact Spring Tension—17 to 19 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.
Timing—On engines using straight run gasoline, with No. 1 piston on T.D.C., power stroke, flywheel mark "DC 1-8" opposite pointer, rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should open. On engines using Ethyl gasoline, set stationary breaker points to open when flywheel mark "DC 1-8" is 1¼ inches below pointer, as No. 1 piston is coming up on compression stroke.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 42. Slowly turn engine until No. 1 piston is coming up on compression stroke. On engines using straight run gasoline stop when piston reaches exact T.D.C., as indicated on Gauge. On engines using Ethyl gasoline, stop when .021 inch before T.D.C.
Spark Plugs—14-MM (Champion type J-7); Gap .020 to .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Automatic Advance—17½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
800	400	Start
1000	500	1
1900	950	6
3000	1500	12
4000 (Max.)	2000	17½

Lock Ignition Coil—Auto-Lite, CE-4303.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBK-4602, (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	775	6.2	10	1175	7.1
2	850	6.3	12	1280	7.3
4	925	6.5	16	1450	7.6
6	975	6.7	18	1850	7.8
8	1085	7	22	2400 (Max.)	8.3

Motoring Freely—5 amps. at 6 volts.

Max. Stall Current—25 to 28 amps. at 5½ volts.

Field Test—3.9 amps. at 6 volts across field coils in series.

Field Fuse—7½ amp. (Type 1A-7½) in regulator unit.

Brush Spring Tension—18 to 22 oz. on each (new brushes).

Armature—Auto-Lite, GBK-2055.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAYS

Cut-Out Relay, Auto-Lite, CBA-4002

Closes—6¼ to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .020 inch, contacts closed.

Charge Regulator—Auto-Lite, XA-414-S

NOTE For special instructions on theory of operation and how to service regulator, see "Charge Regulator" page, Sec. AA

LIGHTING

Switch—Soreng-Manegold, No. B-5670-A.

Location—Behind instrument board.

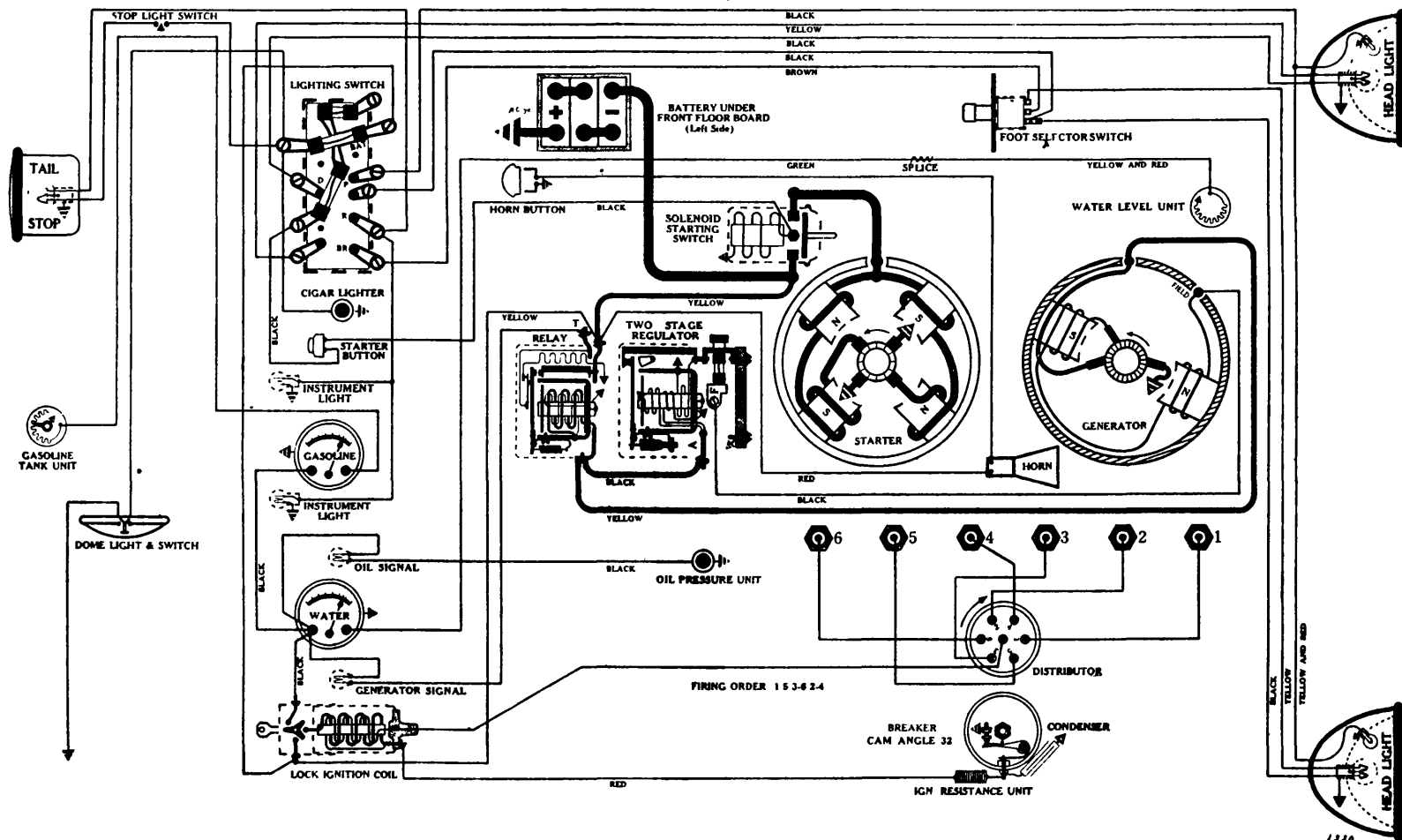
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.

Foot Selector Switch—Soreng-Manegold, No. C-2100-A.

Lamps—See Lamp Table, Sec. AA. HEAD—1110; FENDER—63; INSTRUMENT—63; SIGNALS—64; DOME—87; STOP AND TAIL—1158.

TERRAPLANE

Mod ls K and KU, 6 cyl., (1934)



BATTERY

National, ST3-17X, 6 volts. Positive Terminal Grounded

Starting Capacity—122 amps. for 20 minutes.
Lighting Capacity—4.8 amps. for 20 hours (96 amp. hour).
Box—Length, 10½; width, 10¼; height, 7-13/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4060

Connection to Engine—Bendix Drive, Type A-1588.
Running Free—60 amps. at 5½ volts, 3700 R.P.M.
Cranking Engine—275 to 300 amps. at 4.3 volts.
Lock Torque—15½ pound-feet, 582 amps. at 3 volts.
Brush Spring Tension—44 to 56 oz. on each (new brushes).
Starting Switch—Auto-Lite Solenoid, SS-4001.
Push Button Starting Control Switch—Soreng-Manegold, 5550-A.
Armature—Auto-Lite, MAB-2114.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGB-4301-A

(Full Automatic Spark Advance)

Break r—Contact separation .020 inch.
Cam Angles—Points closed 32 degrees; open 28 degrees.
Contact Spring Tension—17 to 19 oz.
Timing—With No. 1 piston on compression stroke, slowly turn engine until flywheel mark "UDC 1-6" is opposite pointer cast in flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Timing with MOTOR GAUGE—Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 114 and rod No. 43. Slowly turn engine until No. 1 piston reaches exact T.D.C. (compression stroke), as indicated on Gauge.
Spark Plugs—14-MM (Champion type J-7); Gap .020 to .025 inch.
Firing Order—1-5-3-6-2-4.
Automatic Advance—15 degrees (Distributor).
Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist.)
800 400 Start
1460 730 3
2100 1050 6
3160 1580 11
4000 (Max.) 2000 15
Lock Ignition Coil—Auto-Lite, IG-4311.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBK-4602, (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	775	6.2	10	1175	7.1
2	850	6.3	12	1280	7.3
4	925	6.5	16	1450	7.6
6	975	6.7	18	1850	7.8
8	1085	7.	22	2400 (Max.)	8.3

Motoring Freely—5 amps. at 6 volts.
Max. Stall Current—25 to 28 amps. at 5½ volts.
Field Test—3.9 amps. at 6 volts across field coils in series.
Field Fuse—7½ amp. (Type 1A-7½) in regulator unit.
Brush Spring Tension—18 to 22 oz. on each (new brushes).
Armature—Auto-Lite, GBK-2055.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAYS

Cut-Out Relay, Auto-Lite, CBA-4002

Closes—6¼ to 7½ volts.
Opens—½ to 2½ amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .020 inch, contacts closed.
Voltage Operated Regulator, Auto-Lite, TC-4102-A
Points Open—8.2 to 8.6 volts.
Points Close—6.8 to 7.3 volts.
Contact Opening—.009 to .012 inch.
Core Gap—.030 to .040 inch, contacts closed.

LIGHTING

Switches—Soreng-Manegold, No. 5640-A, with electric windshield wiper fuse (as shown). After April 1, 1934 vacuum wipers used, and new lighting switch No. C-5640-A. (For connections see Terraplane Challenger 1934).
Location—Behind instrument board.
Fuses—Two 20 amp. fuses (type 3A-20), and one 7½ amp. fuse (type 1A-7½) mounted on lighting switch.
Foot Selector Switch—Hudson, No. 45978.
Lamps—See Lamp Table, Sec. AA. HEAD—2320-C*; PARK—63; INSTRUMENT—63; SIGNALS—64; DOME—87; VESTIBULE—87; STOP AND TAIL—1158. *A new type bulb.

1935 SUPPLEMENT

The 1935 Supplement comprises 56 new wiring diagrams, with factory specifications (pages 1333 to 1388 inclusive); 32 new technical pages covering the latest electrical developments; together with Supplementary Car, Generator and Starter Indexes, and complete Distributor Index.

No.

- 1333—Auburn, 6-53, 6 cyl.
- 1334—Auburn, 6-53, 6 cyl., with Startix
- 1335—Auburn, 8-51, Straight Eight
- 1336—Auburn, 8-51, "Super-Charged"
Straight Eight
- 1337—Austin, 4 cyl.
- 1338—Buick, Series 35-40, Straight Eight
- 1339—Buick, Series 35-50, Straight Eight
- 1340—Buick, Series 35-60, Straight Eight
- 1341—Buick, Series 35-90, Straight Eight
- 1342—Cadillac, 355-D, "Vee" 8
- 1343—Cadillac, 370-D, "Vee" 12
- 1344—Cadillac, 452-D, "Vee" 16
- 1345—Chevrolet, "Master", Series EA, 6 cyl.
- 1346—Chevrolet, "Standard", Series EC,
6 cyl.
- 1347—Chrysler, C-6, "Airstream", 6 cyl.
- 1348—Chrysler, CS, "Airstream",
Straight Eight
- 1349—Chrysler, C-1, "Airflow",
Straight Eight
- 1350—Chrysler, C-2 and C-3, "Airflow"
Straight Eights
- 1351—DeSoto, SF, "Airstream", 6 cyl.
- 1352—DeSoto, SG, "Airflow", 6 cyl.
- 1353—Dodge, DU and DV, 6 cyl.
- 1354—Ford, 48, "Vee" 8
- 1355—Graham, 74, 6 cyl. Special Six
- 1356—Graham, 73, 6 cyl. Standard Six
- 1357—Graham, 72, Standard Straight Eight
- 1358—Graham, 75, "Super-Charged"
Straight Eight
- 1359—Hudson, 35-GH, Big Six
- 1360—Hudson, 35-HT, 35-HU, 35-HHU,
Straight Eights
- 1361—Hupmobile, D, Series 518, 6 cyl.

No.

- 1362—Hupmobile, O, Series 521,
Straight Eight
- 1363—Lafayette, 3510, 6 cyl.
- 1364—LaSalle, 35-50, Straight Eight
- 1365—Lincoln, 67 Degree "Vee" 12
- 1366—Nash, 3520, Twin Ign. Advanced Six
- 1367—Nash, 3540 or 3640 Single Ign. Six
- 1368—Nash, 3580, Advanced & Ambassador
Straight Eights
- 1369—Oldsmobile, F-35, 6 cyl.
- 1370—Oldsmobile, L-35, Straight Eight
- 1371—Packard, One Twenty Straight Eight
- 1372—Packard, Twelve Hundred Series,
Straight Eights
- 1373—Packard, 1206, 1207, 1208, "V"
Twelves
- 1374—Pierce-Arrow, 845, Straight Eight
- 1375—Pierce-Arrow, 1245 and 1255,
"Vee" 12
- 1376—Plymouth, PJ, Plymouth Six
- 1377—Plymouth, PJ, 6 cyl., Plymouth DeLuxe
- 1378—Pontiac, 701-A and 701-B, 6 cyl.
- 1379—Pontiac, 605, Straight Eight
- 1380—Reo, 7S-35, 6 cyl.
- 1381—Reo, 6A-35, 6 cyl.
- 1382—Studebaker, 1-A, 6 cyl., Dictator
Standard
- 1383—Studebaker, 2-A, 6 cyl., Dictator
DeLuxe
- 1384—Studebaker, 1-B, Commander
Straight Eight
- 1385—Studebaker, President Straight Eight
- 1386—Terraplane, 35-G, Special, 6 cyl.
- 1387—Terraplane, 35-GU, DeLuxe, 6 cyl.
- 1388—Willys, 77-B, 4 cyl.

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1935 TECHNICAL SECTION

INSTRUCTIONS FOR FILING 1935 TECHNICAL DATA IN STANDARD AUTO-ELECTRICIAN'S MANUAL.

If this Supplement is added to an early edition Manual with an "AA" Section (pages 1 to 94), keep this entire new 1935 Technical Section in the same order as you receive it, and insert in Manual as a group following page 94, Section "AA".

Late edition Standard Manuals (starting in 1934 with Edition T) have a revised Technical Section, instead of "AA" pages. When adding a 1935 Supplement to these Manuals simply insert the new sheets in their proper places, referring to the classifications found at top of each page.

The page size of late edition Standard Manuals has been increased slightly in order to make it possible for us to include additional information for your use. This Supplement is printed on the new size sheets.

Because of the demand for accurate test data for use with Motor Analyzers, Oscillographs and other Precision Instruments, manufacturers have recently revised their test specifications, especially those pertaining to voltage regulators, cut-outs, and distributor spark advance governors.

In preparing this Supplement we have used the latest, as well as the most authentic information now available.

The new, complete Distributor Index will be found most useful by operators specializing on this type of work.

THE RED SEAL TYPE "F" STARTIX

The type "F" Startix was developed primarily for use in conjunction with generators having a very low voltage build-up at slow or idling speeds. In view of the fact that the new Dyneto, heavy duty generators, which use a high capacity armature, have this low voltage characteristic, it was necessary to adopt the red seal, type "F" Startix for use on 1934-35 Packard installations, with the exception of the Packard Model One Twenty.

Structurally the only difference between the early type "D" Startix and the new type "F" unit is that a low resistance generator or voltage winding is now used on the Startix relay solenoid. To make this winding effective at low generator voltages, and yet to protect it against the higher voltage values when the generator is charging, a special generator cut-out relay must be used, having an extra set of contact points and a resistance unit which is automatically placed in series with the new Startix winding when the generator starts to charge, and the points on the cut-out relay close.

When the engine slows down or is idling, and the generator voltage falls below that of the battery, the cut-out points open, and the resistance unit is automatically shorted out of the Startix circuit. With the upper set of cut-out contacts in this position the Startix winding is connected directly to the insulated main brush of the generator. This arrangement always limits the amount of current which can flow thru the Startix winding to safe values.

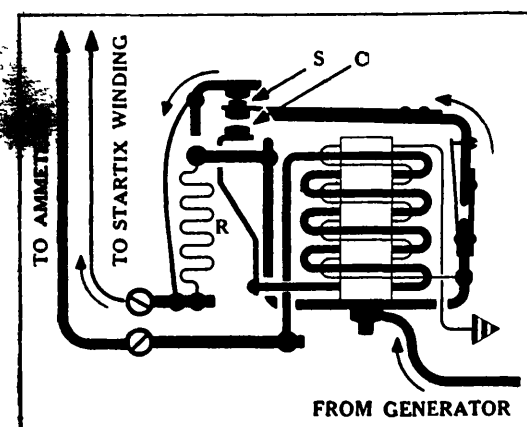


Fig. 7

Internal Circuits of the Owen-Dyneto Type 40203 Relay-Regulator showing the Cut-Out Points in the Open Position.

Figure 7 shows the internal circuits of the new 40203, Owen-Dyneto relay regulator, used on 1935 Packard automobiles. The conventional cut-out points "C" (which always are in series with the charging line) are shown in an open position, as would be the case were the engine idling at a slow speed and the generator brush voltage were lower than the battery voltage. The factory specifications call for a separation of approximately .030 inch. The upper set of contacts "S", which also serve as the stop for the cut-out armature, are shown in a closed position. Arrows show the path of current thru the unit from insulated generator brush on its way to the Startix winding.

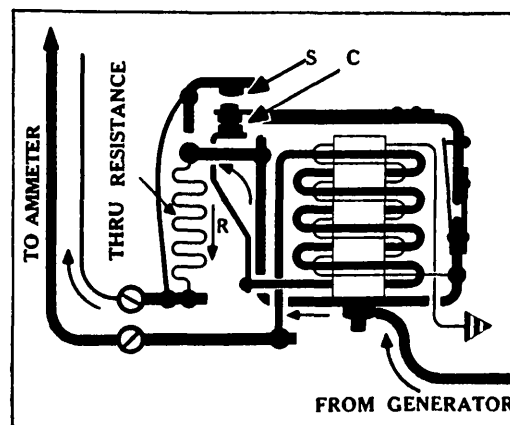


Fig. 8

Internal Circuits of the Owen-Dyneto Type 40203 Relay-Regulator showing the Cut-Out Points in the Closed Position.

From Fig. 7 it will be seen that the resistance unit "R", while in parallel with the top set of points "S", actually is "shorted out" of the circuit. Fig. 8 shows the same unit with the cut-out points "C" closed and the top set of points "S" open. The arrows show the path of current thru the resistance unit on its way to the Startix winding, when the generator brush voltage is higher than battery voltage and the generator is charging.

The type "F" Startix is readily identified by a name plate of similar design to that previously used, except that the background is now RED instead of black. The type designation and operating voltage is now stamped in imprinted rectangular blocks. Under no circumstances should the red seal, type "F" Startix be used with a conventional cut-out, since to do so would result in burning out of the generator or voltage winding in the Startix unit.

The new high out-put Dyneto armatures are interchangeable with armatures found in older model generators on Packard automobiles, and the new armatures should be used for replacement or service work. When a new high out-put armature is substituted in a generator, taken from a car equipped with a type "D" Startix, it will be found impossible to get adequate voltage to prevent the Type "D" Startix from cutting in at idling speeds. To overcome this it will be necessary to change to the type "F", red seal Startix, and to replace the relay-regulator with a new 40203 unit, with the extra set of points and resistance.

The basic operation of type "F" Startix is similar to the type "D" and, therefore, requires a proper functioning generator to obtain satisfactory performance. It is possible that a generator may have a poor commutator condition such as high mica, badly worn brushes, oil or glaze on the commutator, and still charge the battery more or less satisfactorily at high rates of speed. At low generator speeds, however, when the engine is idling, the out-put from a generator in this condition, perhaps, would not be adequate to give satisfactory Startix hold-down. A generator having an eccentric commutator will show a charge at low speeds when new but will not charge at high speeds, and the result, after considerable high speed driving, will be a badly burned commutator and brushes, which will eventually result in the generator not charging at any speed.

In cases of this nature the Startix is not at fault, and corrections should be made to bring the generator back to normal. If the Startix cuts in at idling speeds, when the voltage measured between the generator terminal on Startix and ground is greater than .07 volts, the Startix is defective; however, if the voltage measured at this point is less than .07 the generator or cut-out is defective, and the conditions causing this deficiency in voltage should be corrected.

LAMP DATA

REVISED TO JUNE 1, 1935

Code numbers, technical specifications and data verified by The Nela Park Engineering Department
of the General Electric Company, Nela Park, Cleveland, Ohio.

CONVENTIONAL MAZDA LAMP

No.	USED FOR	VOLTS	C.P.	BASE	AMPS.	STYLE	B or C
50	Head Light Indicators (Cadillac and LaSalle 1934)	6-8	1	Miniature Screw	0.20	G-3 1/2	B
51	Indicators, Instrument	6-8	1	Miniature Bayonet	0.20	G-3 1/2	B
55	Indicator, Inst., Aux. Head	6-8	1.5	Miniature Bayonet	0.40	G-4 1/2	C
61	Rear & Inst. (2 in series)	3-4	2	S.C.	0.84	G-6	B
62	Rear & Inst. (2 in series)	3-4	2	D.C.	0.84	G-6	B
63	REAR, INST., MARKER, PARKING	6-8	3	S.C.	0.53	G-6	C
64	REAR, INST., MARKER, PARKING	6-8	3	D.C.	0.53	G-6	C
67	REAR, INST., MARKER, PARKING	12-16	3	S.C.	0.29	G-6	C
68	REAR, INST., MARKER, PARKING	12-16	3	D.C.	0.29	G-6	C
81	DOVE PANEL, INSTRUMENT	6-8	6	S.C.	0.88	G-6	C
82	DOVE PANEL, INSTRUMENT	6-8	6	D.C.	0.88	G-6	C
87	Stop, Backing, Dove	6-8	15	S.C.	1.71	S-8	C
88	Stop, Backing, Dove	6-8	15	D.C.	1.71	S-8	C
89	Dome & Panel, Sign, Marker	12-16	6	S.C.	0.52	G-6	C
90	Dome & Panel, Sign, Marker	12-16	6	D.C.	0.52	G-6	C
1000	Head (2 filaments) depressible beam	6-8	32 } 32 }	D.C.	3.70 } 3.70 }	RP-11	C
1110	Head (2 filaments) depressible beam	6-8	21 } 21 }	D.C.	2.46 } 2.46 }	RP-11	C
1114	Head (2 filaments) depressible beam	6-8	21 } 21 }	D.C.	2.46 } 2.46 }	RP-11	C
	<i>Read foot-note before installing.</i>						
1116	Head (2 filaments) depressible beam	6-8	32 } 21 }	D.C.	3.70 } 2.46 }	RP-11	C
1118	Head (2 filaments) depressible beam	6-8	32 } 21 }	D.C.	3.70 } 2.46 }	RP-11	C
	<i>Read foot-note before installing.</i>						
1129	HEAD, SPOT, STOP, DRIVING LAMPS	6-8	21	S.C.	2.39	S-8	C
1130	HEAD, SPOT, STOP, DRIVING LAMPS	6-8	21	D.C.	2.39	S-8	C
1133	HEAD, SPOT, STOP, DRIVING LAMPS	6-8	32	S.C.	3.62	RP-11	C
1134	HEAD, SPOT, STOP, DRIVING LAMPS	6-8	32	D.C.	3.62	RP-11	C
1141	Head, Spot, Driving Lamps	12-16	21	S.C.	1.18	S-8	C
1142	Motor Coach, Headlamps, Interior	12-16	21	D.C.	1.24	S-8	C
1143	Head, Spot, Driving Lamps	12-16	32	S.C.	1.76	RP-11	C
1144	Head & Spot, Interior	12-16	32	D.C.	1.86	RP-11	C
1158	Head for Fords (1921 to 1928)	6-8	21 } 3 }	D.C.	2.45 } 0.53 }	S-8	C
	Also Stop and Tail from 1929 on						
1170	Head for Fords (1921 to 1928)	6-8	21 } 6 }	D.C.	2.49 } 0.90 }	S-8	C
1172	Head for Fords (1921 to 1928)	6-8	32 } 6 }	D.C.	3.70 } 0.90 }	RP-11	C
2320	See next page.						
2330	See next page.						
3001	Head for Cadillacs (1932-33 only)	6-8	21 } 21 }	T.C.*	2.92 } 2.92 }	S-12	C
			32 }		4.09 }		
3003	Head for Packards (1933-34 only)	6-8	32 } 32 }	T.C.*	4.15 } 4.15 }	S-12	C
			32 }		4.15 }		

*Triple Contact.

IMPORTANT: Mazda lamps Nos. 1000, 1110, and 1116 are interchangeable. Automobiles equipped with depressible beam headlights (sometimes called "Tilt-Ray" or "Bifocal" headlights) are usually delivered with the 21-21 C.P., No. 1110 lamps as original equipment. If higher C. P. lamps are desired, substitute the 32-32 C.P., No. 1000 lamps, or the No. 1116 lamps. *Under no circumstances use lamps Nos. 1114 or 1118 in these cars.*

The difference between Mazda lamps Nos. 1000, 1110, and 1116, and Mazda lamps Nos. 1114 and 1118 is in the plane of the base pins.

(OVER)

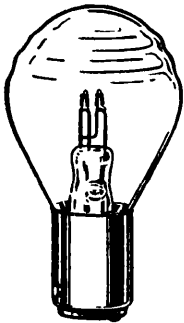
LAMP DATA

(continued)

REVISED TO JUNE 1, 1935

The new Prefocused Lamp developed for headlights on 1934 and 1935 automobiles.
(Prefocused lamps will not fit conventional lamp sockets).

A MAJOR ADVANCE IN HEADLIGHTING PRACTICE.



CONVENTIONAL LAMP

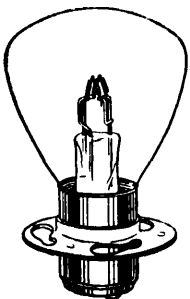
The new Prefocused lamp which was introduced on a large number of 1934 cars constitutes another forward step in automotive lighting.

It insures more uniform performance of headlights throughout life of car.

It makes possible a new design in headlight equipment so that headlights may be made smaller—to become part of the car's streamlines.

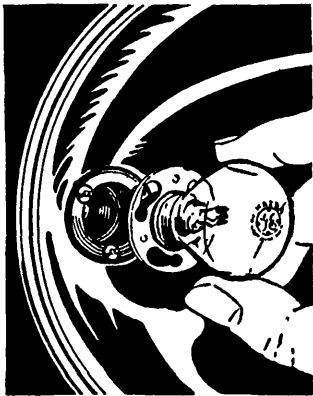
It makes for greater beam accuracy.

The lamp itself is made with extreme precision. The maximum tolerance in the location of the filament is .010 of an inch. The reflector-socket assembly is also made with greater accuracy.



PREFOCUSED LAMP

EASY TO INSTALL



Insertion of the lamp is easier than under the old method. The flanged collar has three "buttonholes" unequally spaced, which engage three pins in the socket. The base is marked "TOP". At this point there is a notch on the collar to aid in correctly aligning the wide ends of the buttonholes with the socket pins.

Hold lamp in position marked "TOP".

Make certain that the pin heads of socket engage wide ends of buttonholes.

Press firmly into cup-like section in rear of reflector.

Rotate clockwise until lamp clicks into its seat. To remove lamp reverse the operation.

PREFOCUSED MAZDA LAMP

No.	USED FOR	VOLTS	C.P.	BASE	AMPS	STYLE	B or C
2320	Head (2 filaments) depressible beam	6-8	32	Pre-	4.13	RP-11	C
			21	Focused	2.71		
2330	Head (2 filaments) depressible beam	6-8	32	Pre-	4.13	RP-11	C
			32	Focused	4.13		

THE ELECTRIC HAND

TRANSMISSION CONTROL.

Optional Equipment on 1935 Hudson and Terraplane Automobiles.

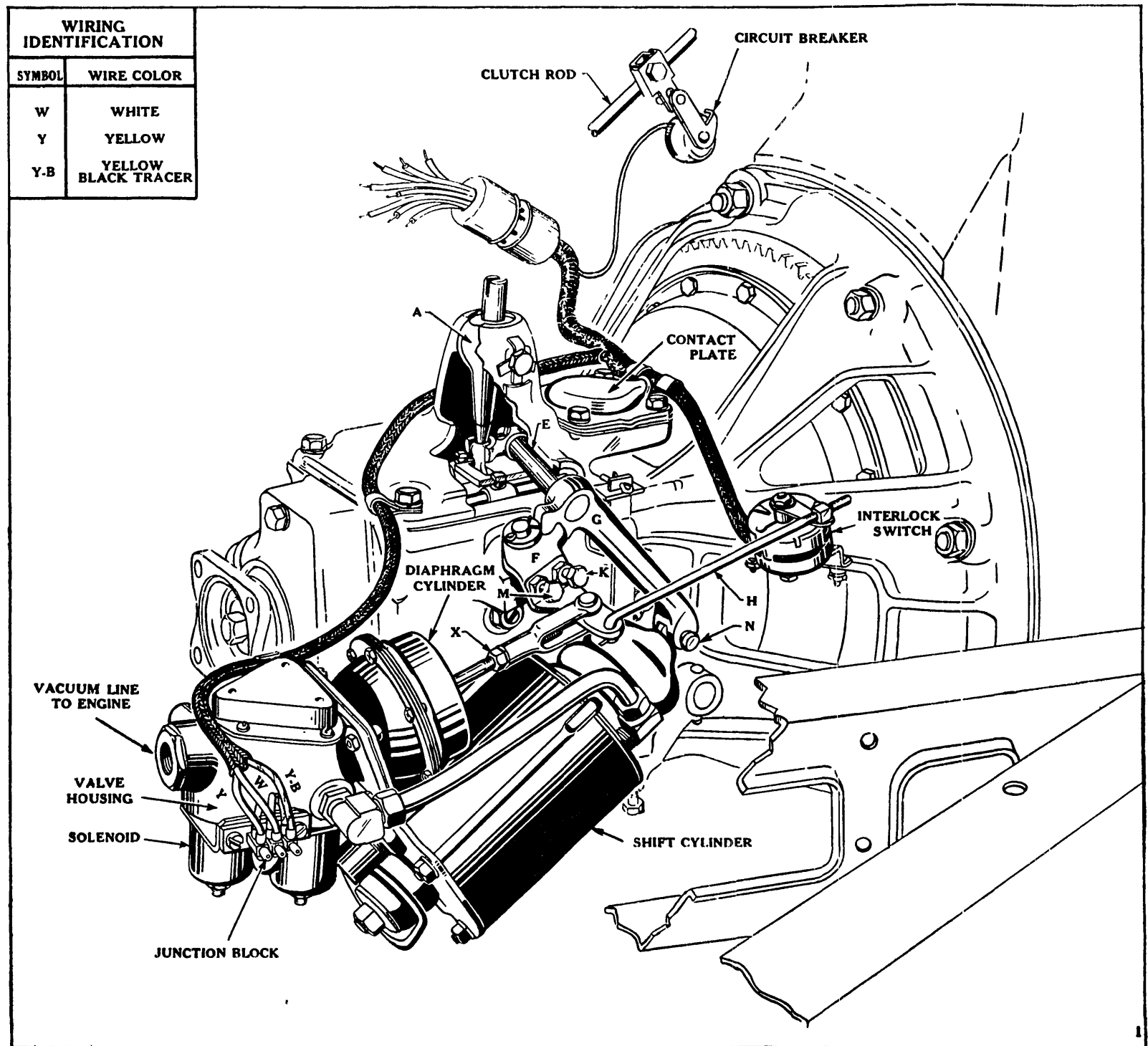


Fig. 1
External View of Hudson Transmission showing General Arrangement and Mounting of the Power Units which are used with the Electric Hand.

The Electric Hand should in no way be confused with electric gear shifts which made their appearance many years ago. Generally speaking, electric gear shifts employed a strong electro magnet or, more often, solenoids to move the transmission gears from one speed to another. Because of the heavy transmission drag, especially in cold weather, it was necessary to use very powerful magnets to supply the necessary energy to shift gears. Two decided disadvantages were encountered; first, it required a heavy current flow to energize the magnets, which meant a heavy draw on the battery, and secondly, the switching of this heavy current resulted in arcing and burned switch contacts, which soon gave trouble.

The Electric Hand has completely overcome these disadvantages by making use of the engine vacuum to supply the necessary energy to move the transmission gears from position to position. The only part electricity plays in the operation is to change the positions of three valves, in the vacuum unit. The operation of these three valves is very similar, indeed, to the operation of the three

valves on a cornet and, as a matter of fact, require about the same effort to move them as cornet valves. This means that the expenditure of electrical energy is negligible (the solenoids draw about 2½ amps.) and, consequently, there is no problem of burned switch contacts.

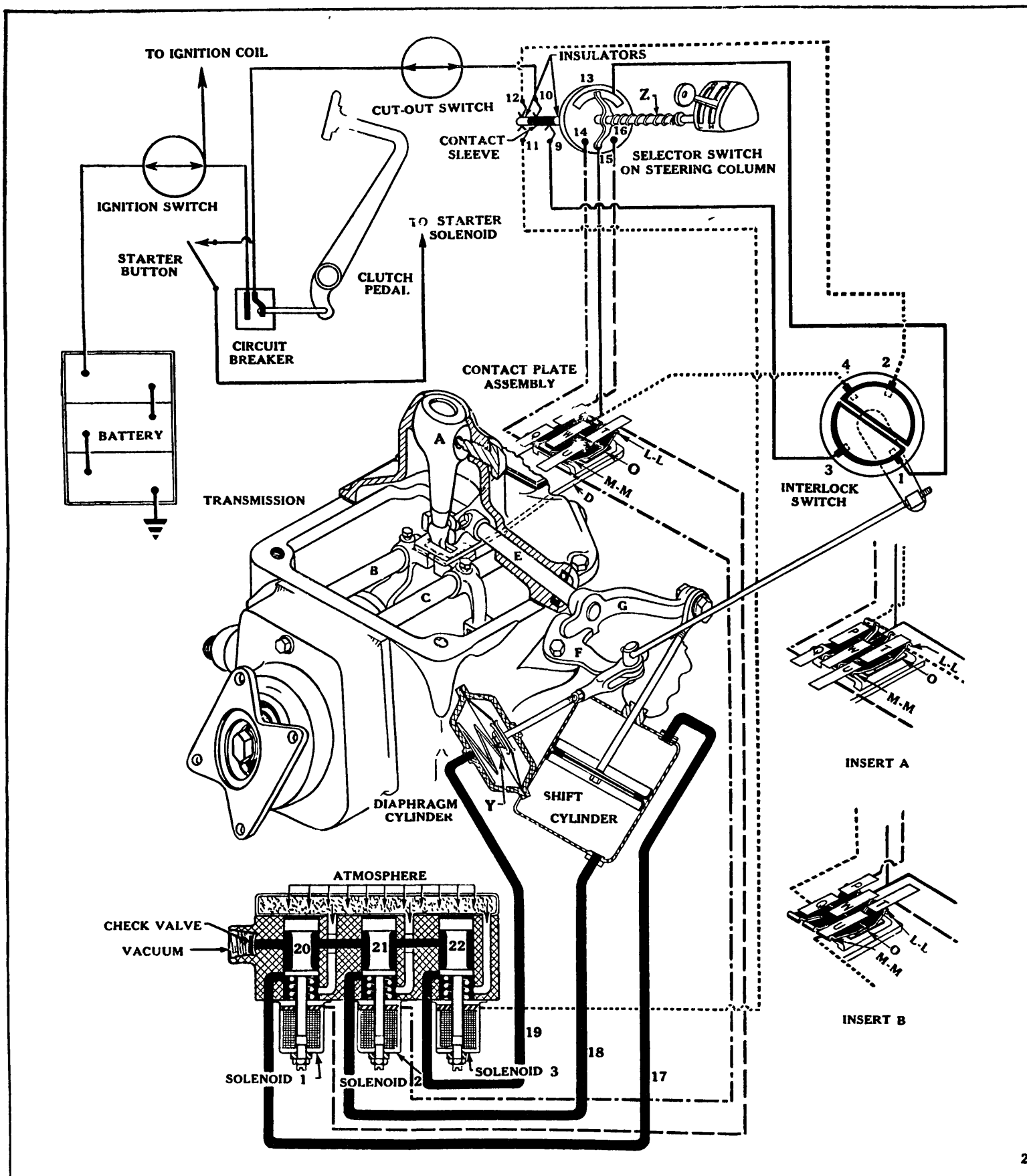


Fig. 2
Spring "Y" in Diaphragm Cylinder presses forward and holds Bellcrank "F" in position shown.

In place of the well known and awkward gear shift lever, which requires considerable space, we now find a miniature gear shift lever mounted in an accessible position just below the steering wheel. This part is known as the selector switch. The advantages of this device are so manifest that without question it is here to stay, and will be found on other makes of automobiles in the near future. Auto-electricians will soon be called upon to service these units, and a thorough knowledge of the principles of operation is essential before any service work is undertaken.

THEORY OF OPERATION.

In any selective type of transmission there are two "shifting rails" or rods which carry the forks that move the transmission gears forward and backward. Each fork has a neutral, a forward, and a backward position. In changing gears the selection of the proper fork is made by moving the gear shift lever sideways. After this is done the change in gears is accomplished by moving the shift lever forward or backward. These same operations are performed by the Electric Hand.

By referring to Fig. 2 it will be seen that the diaphragm cylinder contains a spring which presses forward holding bellcrank F in the position shown so that the shifting lever is held to the left in engagement with the slot in the fork of the high and second shifting rail. By admitting vacuum to the rear of the diaphragm it is moved backward, rotating F clockwise, drawing lever G to the right and also the shifting lever into engagement with the slot in the fork of the low and reverse shifting rail. The vacuum connection is shown from the diaphragm cylinder to the valve controlled by solenoid No. 3. The Plunger 22 is held in the upward position by its return spring, the vacuum from the engine is cut off and the atmospheric vent is connected below the plunger to the diaphragm cylinder line allowing the spring Y to force the diaphragm forward.

When the solenoid is energized, plunger 22 is drawn down, cutting off the atmospheric vent and connecting the engine vacuum around the reduced diameter of the plunger, to the diaphragm cylinder (Fig. 3).

When solenoid No. 3 is not energized the spring Y holds the shifting lever "A" engaged with the high and second shift rail (Fig. 2).

When solenoid No. 3 is energized the vacuum draws the diaphragm backward, holding the shift lever "A" engaged with the low and reverse rail (Fig. 3).

The Shift Cylinder has vacuum lines connected to both the front and rear of the piston. The connection to the front is connected to the valve controlled by solenoid No. 1 and the connection to the rear to the valve controlled by solenoid No. 2. The linkage between the Shift Cylinder Piston and the lower end of the shift lever "A" requires both to move in the same direction.

When solenoid No. 1 is energized, the piston and lever "A" move forward. When solenoid No. 2 is energized, the piston and lever "A" move backward. When neither No. 1 nor No. 2 solenoid are energized both sides of the shift cylinder are open to the atmosphere and the piston is at rest.

Solenoid No. 1 is connected to the stationary bar T of the contact plate and will be energized whenever the circuit from the battery is completed to T. Likewise, solenoid No. 2 is connected to stationary bar U of the contact plate and will be energized by completing the battery circuit to U.

The sliding contacts LL and MM are insulated from each other as well as from their mounting and are moved forward or backward with the transmission lever movement through the connecting bar D. Sidewise movement of the shifting lever "A" does not affect the position of the sliding contacts LL and MM.

The circuit from the battery to T can be completed through the three fingers of sliding contact LL, from either the stationary bar W or P; while the circuit from the battery can be completed to bar U through the three fingers of sliding contact MM from stationary bars Q or W.

The connection from solenoid No. 3 is direct to contact 11 on the shaft of the selector switch.

From the preceding explanations the following facts have been established:

- (1) Where the circuit is completed from the battery to T the shifting rail movement will be forward.
- (2) When the circuit is completed from the battery to U the shifting rail movement will be to the rear.
- (3) When the circuit to 11 is open, the shifting lever "A" will be pressed toward the notch in the high and second shifting rail, B.
- (4) When the circuit 11 is closed, the shifting lever "A" will be drawn toward the low and reverse shifting rail, C.

The selector switch, in conjunction with the contact plate and the interlock switch (Fig. 1), controls the circuits to these points.

The selector switch Fig. 2 has five positions arranged in the form of the letter H. The cross bar represents the neutral position while the four ends of the uprights of the H correspond to the four gear positions of the transmission and are arranged in the same order as the positions of the conventional transmission shifting lever.

In Fig. 2 the selector switch is shown in its normal neutral position. The spring "Z" holds the shaft and the lever to the right end of the cross bar of the H in line with the high and second gear positions. Note that this corresponds to the normal position of the shifting lever "A" which is held in proper engagement for a direct shift into high or second by the spring "Y" of the diaphragm cylinder. It is, therefore, unnecessary to provide a contact for 11 for shifting to high or second gear as no cross shift is required and 11 rests on an insulated sleeve on the selector switch shaft. If, however, the control lever is pushed to the left of the cross bar, in line

with low and reverse positions, it is necessary to have a cross shift to engage the low and reverse shifting rail. The contact sleeve on the selector switch shaft is moved to the left by the left movement of the control lever so that it is contacted by 11.

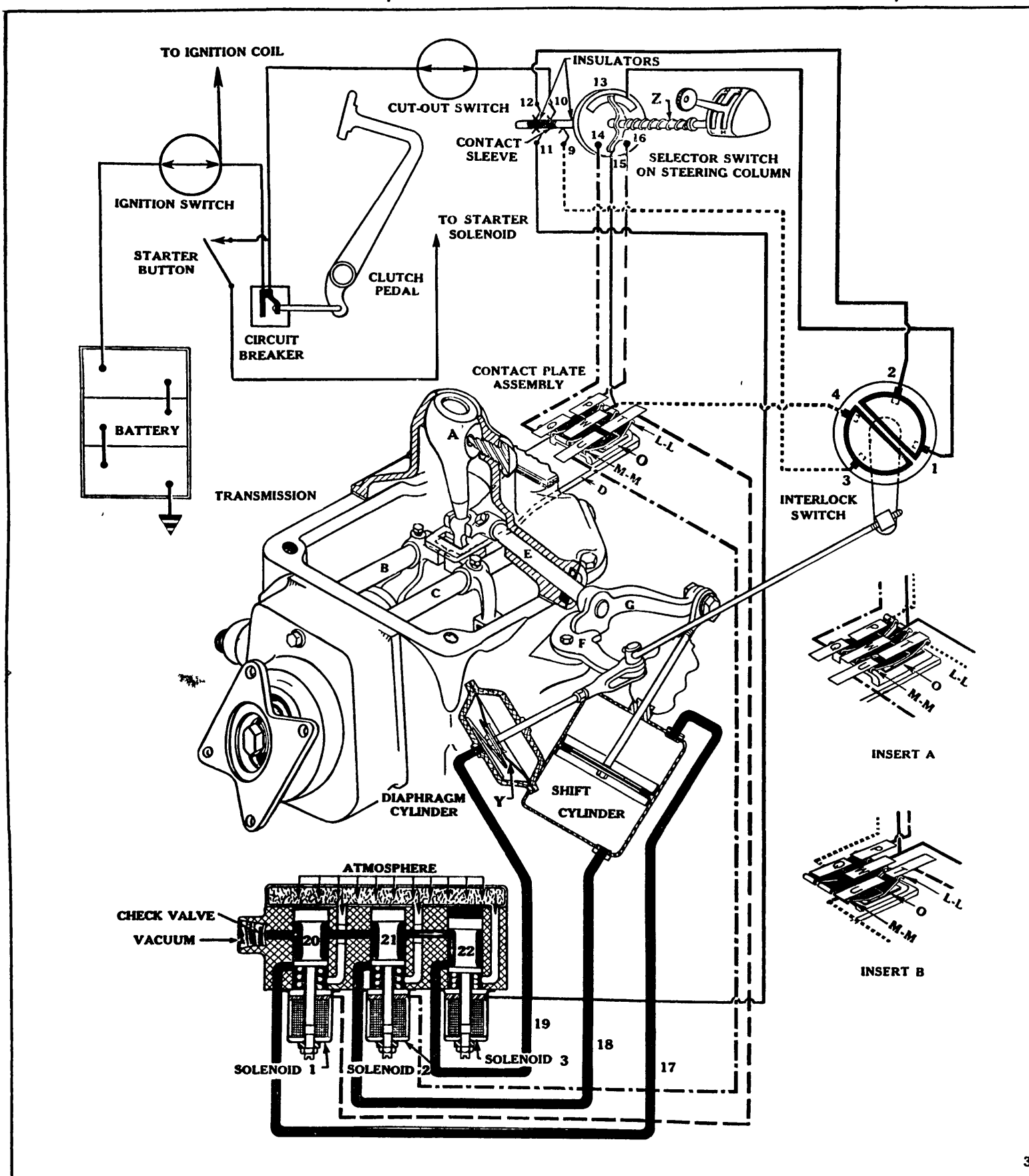


Fig. 3
Solenoid 3 is energized, which cuts off the Atmospheric Vent and, at the same time, connects Engine Vacuum to Diaphragm Cylinder.

The rotating motion of the selector switch lever rotates a contact bar which is always in contact with sector 13 and also contacts 14 when the lever is in reverse or second, 15 when in neutral and 16 when in high or low.

Having now provided the means of shifting the transmission and a switch for selecting the gear required, the actual circuits for obtaining the desired movements for a given position of the transmission and selector switch will now be considered.

The circuit from the battery leads to the ignition switch to the circuit breaker on the clutch pedal, (circuit closed with clutch depressed) the cut off switch on the selector switch housing to contact 10 which is at all times in contact with the sleeve on the shaft of the selector switch.

With the selector switch in the normal neutral position and the transmission in neutral as shown in Fig. 2 the circuit from 10 is completed to 9 to 3 and 1 on the interlock switch to 13 and 15 on the selector rotary switch to contact bar W. (Circuit shown in solid lines.)

With the transmission in neutral, neither LL nor MM contact W, so that the circuit is broken at this point and no movement of the shift rails is obtained.

If, however, the transmission were in high gear, the shifting lever "A" would be forward holding LL and MM forward as shown in Insert A. This would bring the middle finger of MM in contact with W closing the circuit to U and solenoid No. 2, and the shifting lever "A" would be moved backward to neutral at which point contact would be broken as in the main diagram of Fig. 2 and movement would cease.

With the transmission in second gear the contacts LL and MM would be moved backward (Insert B) and contact would be made from W thru LL to T to solenoid No. 1 and the shifting lever would move forward to neutral breaking the contact.

It is readily seen that moving the selector switch down into high gear position would not affect the circuit except from 13 to 16 which would connect (circuit in broken line) to P through LL to solenoid No. 1 and shift rail B would be moved forward from neutral engaging high gear. As the shifting lever and rail moved forward LL and MM would also move forward and the contact between P and LL would be broken, as shown in Insert A. Note that contact is made from P to LL to T with the contact plate either in neutral or the backward position; and the shift would be made to high gear if the transmission was in either second or neutral when the selector switch was moved to high gear position.

Now, moving the selector switch over to the second gear position completes the circuit (dash dot lines) from 13 to 14 to Q through MM to solenoid No. 2, moving the shift rail B backward from neutral to second gear position at which point the contact between Q and MM is broken (Insert B).

Note that contact is completed from Q to MM to U both with the contact block in neutral and the forward position so that the shift would have been made to second gear if the transmission were in either high or neutral when the selector switch was moved to the second gear position.

Fig. 3 shows the selector switch in neutral but moved to the left of the cross bar of the H and the transmission in neutral. With the left movement of the selector switch lever, the contact sleeve has also moved to the left, breaking contact with 9 and contacting 11 and 12. (Completed circuits shown in solid lines). Solenoid No. 3 having been energized from contact 11 has moved the shifting lever into contact with the fork of shifting rail C so that forward and backward movement will now engage low or reverse gears. Note also that the interlock switch has been turned by the backward movement of the diaphragm.

The circuit from 12 is to 2-1 on the interlock switch to 13 to 15 to W. This duplicates the condition in Fig. 2 so that the transmission will be returned to neutral from either low or reverse. Turning the selector to contact 14 now corresponds to reverse and 16 to low gear and forward or backward movement of the shifting lever will engage and disengage low and reverse in the same manner that high and second were controlled in Fig. 2. (Circuit for low shown in broken lines, circuit for reverse in dot and dash).

Fig. 4 shows the transmission in low gear and the selector switch in high. The shifting lever is held to the right as the spring Y cannot force it to the left until the shifting rail has moved to neutral, and the interlock switch is still held in the low and reverse position as in Fig. 3.

When the clutch pedal is depressed the circuit (solid lines) is closed through 10-9 to 3-4 on the interlock switch to W. As shown previously, a completed circuit to W caused the transmission to move to neutral. In this instance the controlling circuit (solid lines) is from W through MM to U to solenoid No. 2 and the first part of the shift will be from low to neutral.

As soon as the shifting lever "A" reaches the neutral position, the spring Y forces it to the left to engage in rail B. This cross movement also turns the interlock switch back to the high and second position as shown in the insert, so that the circuit from 9 is changed (changed circuit shown in broken lines) to 3 to 1 on the interlock switch to 13 and with the selector switch set for high gear, to 16 to P—LL to T and a normal shift from neutral to high is made.

Had the selector switch been set in second gear the connections would be the same until neutral is reached when the circuit will be completed (circuit in dot and dash) from 13 to 14 to Q—MM to U, causing a normal neutral to second shift.

Fig. 5 shows the transmission in high gear and the selector switch set for low. The interlock switch is in the high and second position.

When the clutch pedal is depressed (completed circuits in solid lines) the circuit is completed from 10 to both 11 and 12. The circuit from 11 energizes solenoid No. 3, but since the shifting lever "A" cannot move to the right until shift rail B reaches the neutral position, no movement is caused and the interlock switch remains in the high and second positions.

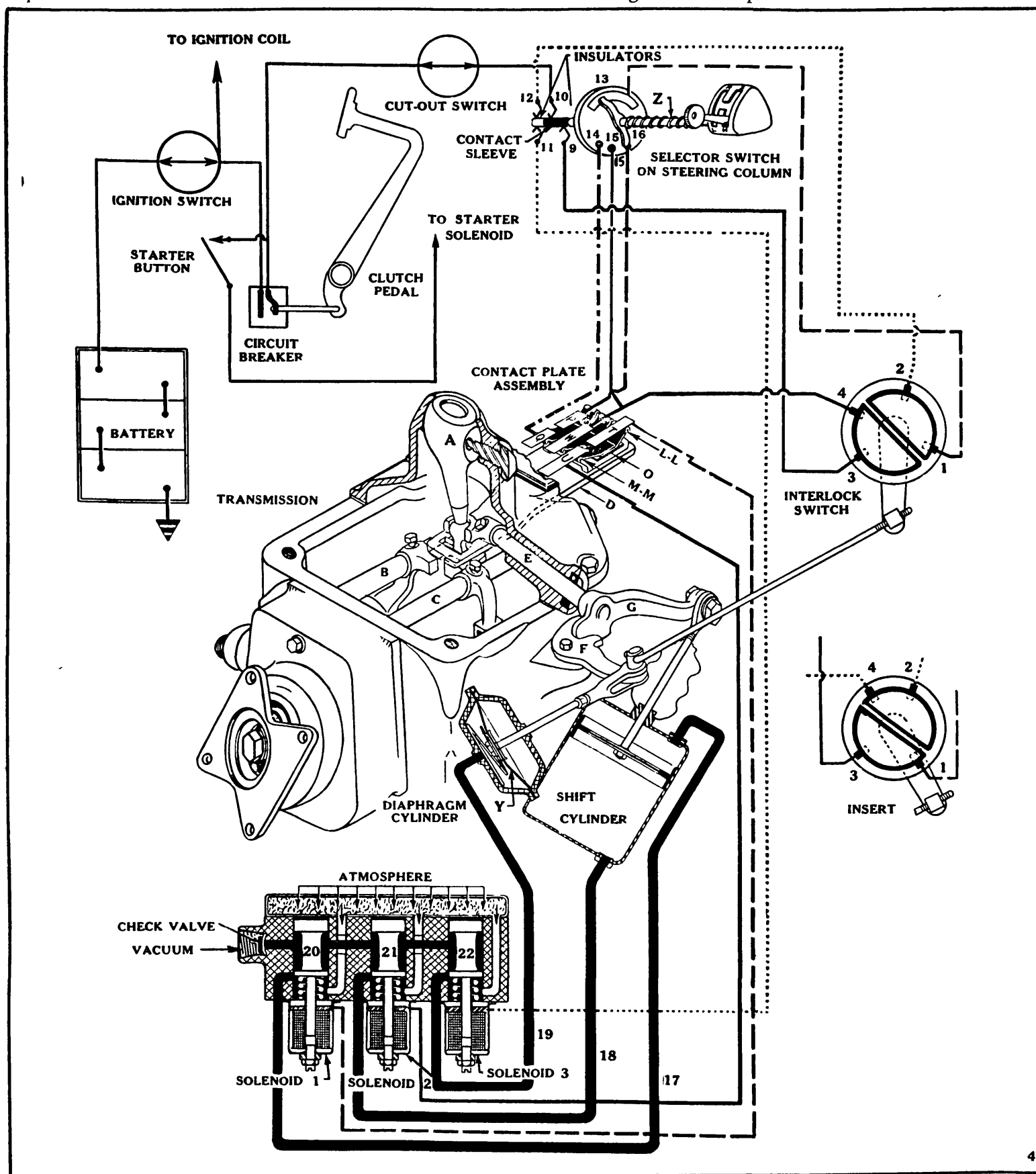


Fig. 4

Transmission in "Low" Gear and Selector Switch in "High" Position.

The circuit from 12 is completed to 2-4 on the interlock switch to contact bar W through MM to U, causing the shift rail B to be moved backward to neutral. Here the movement is arrested by breaking contact between W and MM and the vacuum acting on the diaphragm causes the shift lever "A" to move to the right rotating the interlock switch to the low and reverse position.

The circuit from 12 has now been changed as shown in the insert and is completed (circuit in broken line) through 2-1 of the interlock switch to 13 to 16 to P through LL to T causing a normal neutral to low shift.

Had the selector switch been set to reverse, connecting 13 and 14, the circuit (circuit in dot and dash) would then have been completed to Q through MM to U, causing a normal neutral to reverse shift.

In this discussion it has been seen that the interlock switch has no function so long as the selector switch and the gear shift lever are so set that a straight forward or backward movement of the shift lever "A" is required; however, if a cross movement of the shifting lever "A" is required to complete the desired shift, it requires the transmission to come to neutral and will not permit any further movement of the shifting rails until the cross movement is completed.

As a safety factor the circuit breaker makes it impossible to make a shift until the clutch has been disengaged.

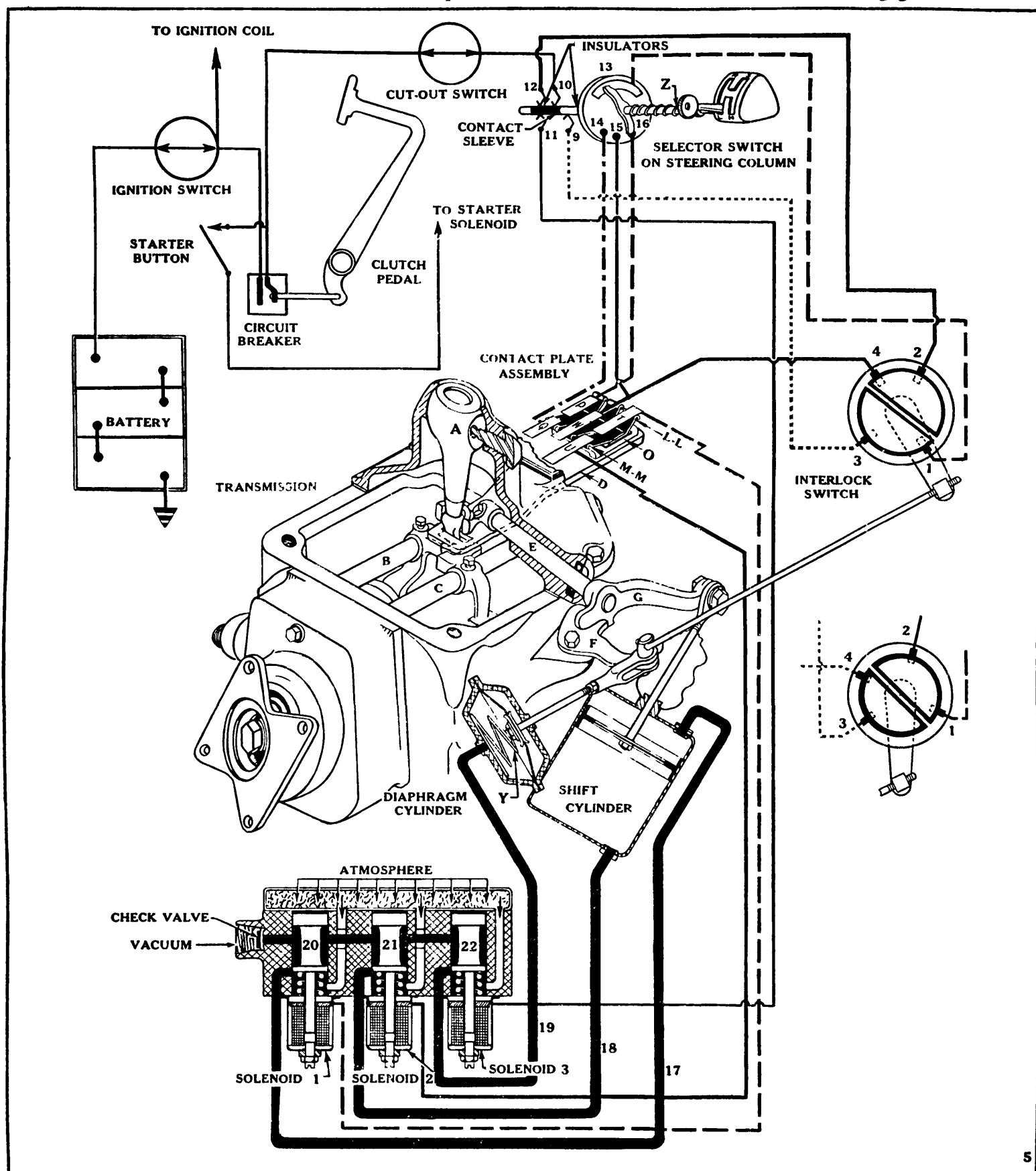


Fig. 5

Transmission in "High" Gear and Selector Switch in "Low" Position.

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Due to the fact that the selector switch lever can be moved to any position after the engine has been stopped without a shift being made, it is impossible to tell by the position of the selector switch lever whether or not the car is in gear when the engine is dead. To prevent starting of the engine with the car in gear a circuit breaker on the clutch pedal requires the disengagement of the clutch before the starter switch circuit is complete.

ADJUSTMENTS.

(A) Adjustment of Cross Shift Stop Screws (Figure 1)

- 1—Shift transmission into high gear.
- 2—Back off stop screw K until it does not touch the stop.
- 3—Turn stop screw K in until it just touches stop, then turn in an additional $\frac{1}{4}$ turn and tighten lock nut. After this adjustment is made a .004" feeler should just pass between the outside face of the lug on lever G and the outside finger of bell crank F.
- 4—Shift transmission into low gear, using power unit.
- 5—Back off stop screw M until it does not touch the stop.
- 6—Turn stop screw M in until it just touches the stop, then turn an additional $\frac{1}{4}$ turn and tighten lock nut. After this adjustment is made a .004" feeler should just pass between the outside face of the lug on lever G and the outside finger of bell crank F.

(B) Adjustment of Length of Diaphragm Cylinder Shaft (Figure 1)

- 1—Remove clevis pin from diaphragm cylinder rod clevis.
- 2—Loosen lock nut X.
- 3—With bell crank lever F pushed forward so that stop screw K is against its stop, turn the clevis until the clevis pin hole is $\frac{1}{4}$ " ahead of the hole in the lever when the diaphragm cylinder rod is in its extreme forward position. Tighten lock nut X.
- 4—Push diaphragm cylinder rod back to align holes and replace clevis pins.

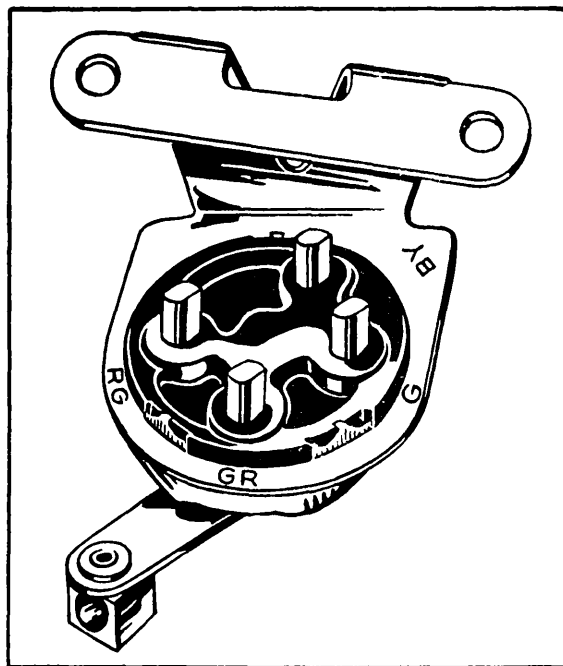


Fig. 6
Early Type Interlock Switches did not have Terminals marked for Wire Colors. The illustration shows a late Type Switch.

(C) Adjustment of Interlock Switch

- 1—Shift transmission into low gear and then into high gear. The pointer on the interlock switch lever should register with the line on the interlock switch cover. If not, adjust as follows:—
- 2—Loosen front stop; then turn rear stop until alignment is obtained while interlock switch lever is held back against rear stop. Then tighten front stop.
- 3—Shift transmission into low gear, then to high and re-check to see that pointer registers with line on interlock switch cover.

(D) Adjustment of Power Cylinder Piston Rod (Figure 1)

- 1—Shift transmission into high gear. Remove clevis pin N from lever G.
- 2—Push rubber piston rod guard back and loosen lock nut on piston rod.

3—Turn rod until clevis pin N can be reinserted with the piston rod pulled to its extreme forward position.

4—Push piston rod back and lengthen four threads by turning clevis. Tighten lock nut.

5—Reinsert clevis pin N.

(E) Adjustment of Clutch Circuit Breaker

With clutch fully engaged, the pointer on the lever should be in line with the arrow on the top of the circuit breaker housing. To adjust:—

1—When equipped with automatic clutch control—Loosen clamp bolt nut on bracket mounted on vacuum clutch rod and slide clip until pointer is in line with arrow. Tighten lock nut.

2—When not equipped with automatic clutch control—remove cotter key from circuit breaker lever pin. Loosen lock nut on operating rod and remove rod end from lever pin. Turn rod end until it will slip on pin with pointer in line with arrow on housing. Insert cotter pin and tighten lock nut.

The adjustment of the clutch circuit breaker is important. To test for the correct position of circuit breaker, shift into low gear and allow the clutch pedal to come back slowly until the clutch begins to drag. This is indicated by a slight vibration in the engine, but should not cause the car to move. While holding the clutch pedal in this position, move the selector to neutral. The transmission should shift to neutral. If it does not shift, move the clutch pedal down slightly. The amount the pedal has to be depressed to complete the shift is an indication of the amount the clutch circuit breaker

arm pointer must be adjusted forward from the normal position mark.

If too much downward pedal movement is required to close the Electric Hand circuit, the shift will not be completed if an end to end condition of gears is encountered. This happens only when the car is standing still and is usually noticed only in attempting to shift into low or reverse.

If insufficient pedal travel is necessary to close the Electric Hand circuit, the gears will grate if a gear is pre-selected, due to the clutch not being sufficiently disengaged when the shift is made.

It is necessary to have a slight clutch drag before the circuit is broken to turn the gears and insure engagement. It may be necessary therefore, to set circuit breaker slightly ahead of indicating arrow.

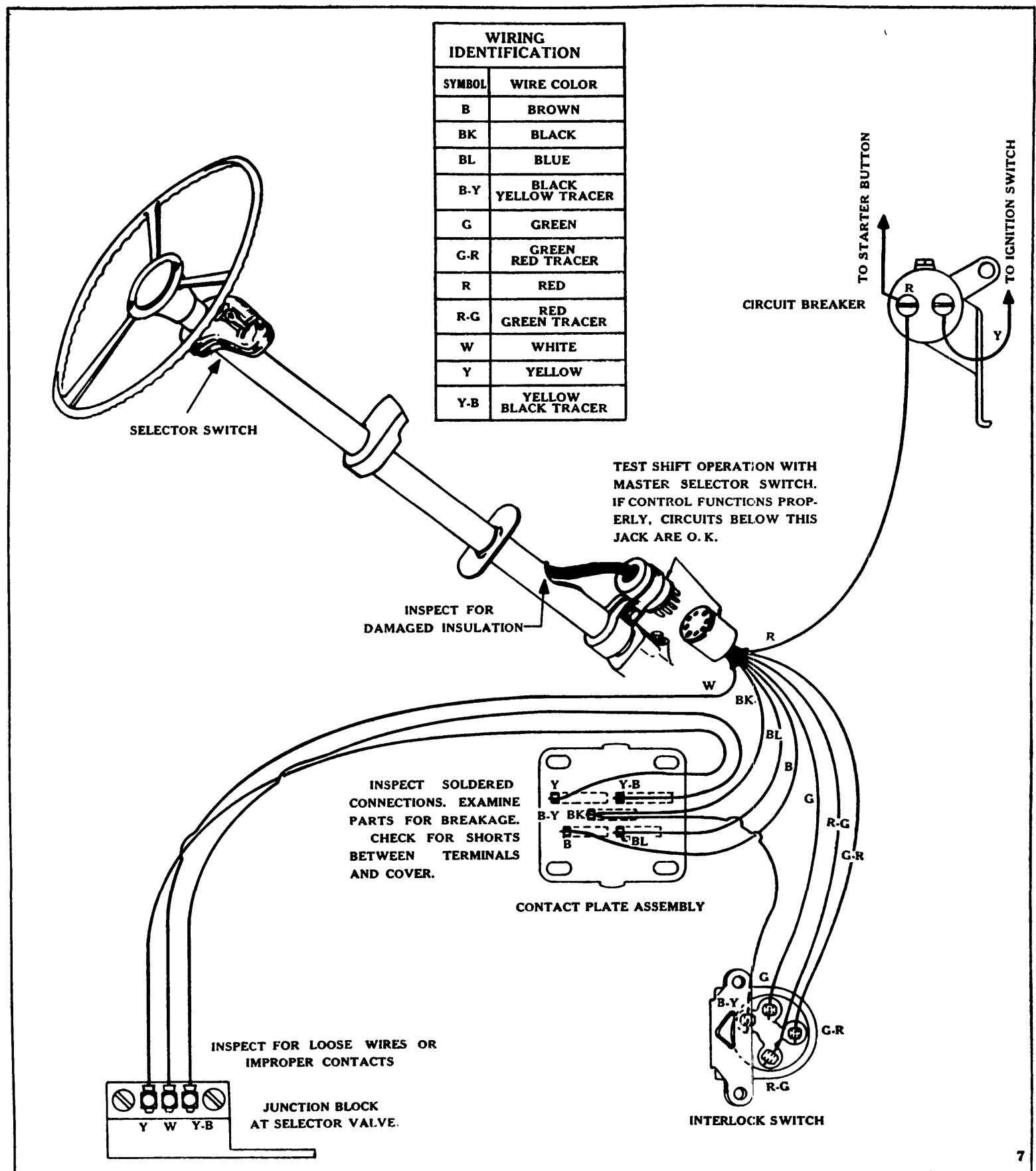


Fig. 7
Circuit Diagram showing Wire Colors and Connections.

SERVICE OPERATIONS.

Preliminary Service Check

The following are to be checked before attempting to make any repairs to the gear shift control mechanism, regardless of the nature of the failure:—

- 1—Be sure Cutout Switch on selector housing is "on."
- 2—Be sure that transmission is free and can be moved into all its positions manually with clutch pedal depressed just enough

to close circuit through clutch circuit breaker. (Check by pressing starter button.) Adjust interlock straps on transmission if necessary.

- 3—If temperatures are encountered low enough to cause the recommended transmission lubricant to retard gear shifting excessively, replace 3 ounces of the lubricant with kerosene.
- 4—Inspect vacuum line and fittings.
- 5—Check wire connections on Interlock Switch.
- 6—Make certain that all clevis pins and cotter pins are in place.
- 7—Inspect junction block on power unit to see that all six wires are in place.
- 8—Make certain that all soldered connections are intact in both portions of steering column jack. (To remove covers, twist, with jack assembled.)
- 9—Check wiring harness for breaks or damaged insulation.

Quick Test for Short Circuit

With instrument panel lamp lighted, shift into all positions with Electric Hand. Any appreciable dimming of instrument lamp indicates short circuit in that position.

Gears are Shifted with Clutch Engaged

Probably short circuit in clutch circuit breaker or improper position of circuit breaker arm.

- 1—Check and if necessary adjust clutch circuit breaker.
- 2—Turn on ignition switch and press starter button—if starter operates with clutch fully engaged, replace circuit breaker.

Complete Failure of Electric Hand to Function

After setting pointer and arrow on circuit breaker in line, turn on ignition switch, depress clutch pedal and press starter button. If starter functions, circuit is closed through circuit breaker. If starter does not function, attach grounded test lamp to yellow wire terminal of circuit breaker. No light indicates open circuit from ignition switch to circuit breaker. Light indicates circuit breaker circuit open. Replace circuit breaker.

Failure of Electric Hand to Function in Any or All Positions

If a proper circuit is proven through the circuit breaker and operation is still faulty, disconnect the separable jack on the bottom of the steering column and insert the jack from a Master Selector Switch and wire assembly. (This unit does not require any ground.) If the system functions properly when using this selector switch instead of the one mounted on the car, replace the complete selector switch and wire assembly. This includes all parts on the steering column, including the upper part of the separable jack. See note on last page of this article if Master Selector Lamp lights. Do not replace selector until short circuit is removed.

Testing the Shifting Mechanism

- 1—Connect Power Unit Test Cable to the terminal on the clutch circuit breaker to which the red wire is attached. This wire should be "hot" only when the clutch is disengaged.
- 2—With the engine running and the clutch disengaged (Rear wheels of car jacked up)—touch the front post (YB) of the junction block on the shifting unit with test prod. The transmission should shift into high gear. Touch rear post (Y) and the transmission should shift to second gear.
- 3—Shift the transmission to neutral manually—First touch center post (W) with the test prod and the cross shift should be made. Still contacting "W," touch front post "YB" with second test prod. The transmission should shift into low. Touch rear post (Y)—still contacting (W), and the shift should be made to reverse.

If a shift is not made when one of the posts is contacted, connect an accurate ammeter to the hot wire and to the terminal. A current draw of approximately 2.5 amperes indicates that the solenoid is O. K. A higher amperage indicates a short and a low amperage an open circuit.

Caution: A dead short circuit in a solenoid will burn out ammeter if permanent connection is made.

If the current draw is correct, the trouble may be due to the valve plunger sticking in its upward position, a vacuum leakage in the lines or units or a mechanical drag in the mechanism.

Disconnect the shifting cylinder piston rod from the shifting lever or the diaphragm cylinder from the cross shift bell crank. If these do not function after disconnecting the linkage, the entire power unit should be replaced.

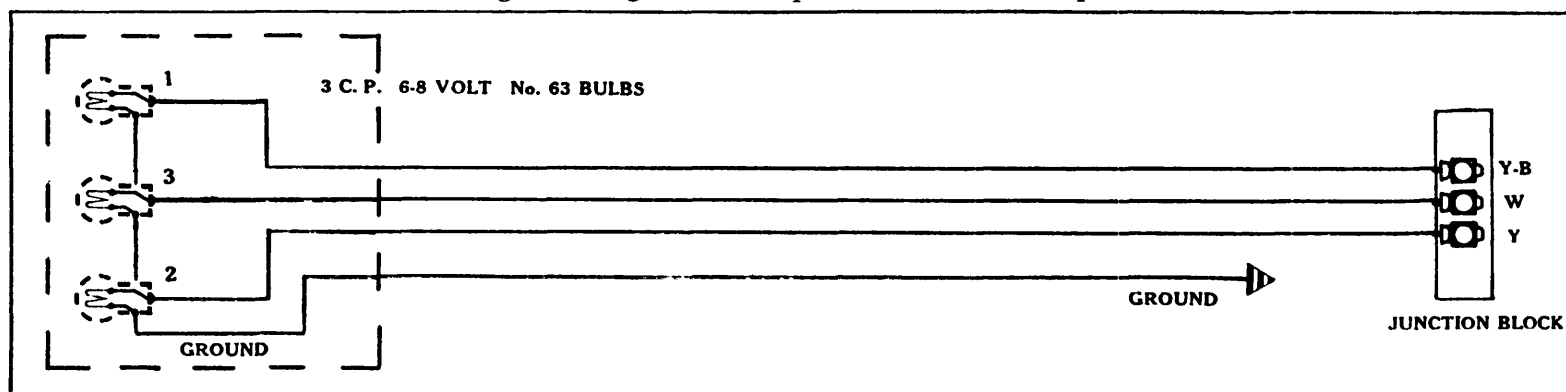


Fig. 2
Circuit Diagram of Lower Harness Test Set.

Testing Circuits in Lower Harness and Switches

If only partial functioning or complete failure is experienced after the Master Selector has been plugged in, test the complete circuits at the solenoid junction block with lower harness test lamp set. (This test must be performed with a Selector Switch known to be O. K.)

- (a)—Remove the three wires on end of wiring harness from junction block on selector valve.
- (b)—Insert these three wires into jack fitting on Lower Harness Test Set, in correct position according to color.
- (c)—Attach ground clip to a clean metal ground on car.
- (d)—Turn ignition switch "on," turn cutout switch "on," and hold clutch fully disengaged.
- (e)—Place Selector Level in neutral. Place transmission in neutral manually.

When shift lever is moved a short distance toward "second," test lamp "YB" should light. When shift lever is moved a short distance toward "high," test lamp "Y" should light.

- (f)—With transmission in neutral, move Selector Lever to "low." Test lamp "W" only must light.
- (g)—Transmission remains in neutral. When Selector Lever is moved into "second" position, test lamp "Y" should light.

When Selector Lever is moved into "high" position, test lamp "YB" should light. Selector in low or in reverse lamp "W" only should light.

- (h)—As the transmission is shifted manually to correspond to any position chosen at the selector switch, the proper lamps, as indicated in "g," should remain lighted during the shift. However, lamp "Y" or "YB," whichever is lighted, should go out when the shift is completed. Lamp "W" alone will remain lighted in "low" or "reverse" position.

If, in any of the above tests, the correct lamps do not light or additional lamps are lighted, replace Selector Switch and Wires Assembly.

Test to detect improper contact plate adjustment. If, after a new lower harness assembly has been installed, either lamp "Y" or "YB" remains on when transmission is in neutral, refer to test (e), the contact plate is incorrectly adjusted. To adjust contact plate, loosen the four screws holding contact plate assembly, then see if plate is free to move back and forth through movement permitted by elongated holes. If not, remove plate from transmission cover and carefully cut off or remove locating dowel pins. The dowel pins on the contact plate have been removed in cars of later production and the location is made positive by drilling through the contact plate into the transmission control housing and dropping a dowel pin into the hole. This dowel is a precaution necessary only for handling in the Assembly Department.

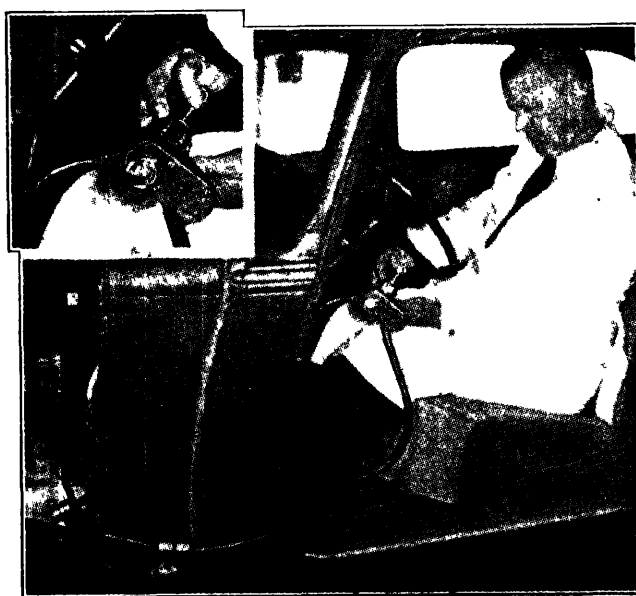


Fig. 9
Using Master Selector Switch to make comparative check of Selector Switch and testing for "shorts".

position can be held permanently by drawing down the four screws which hold the contact plate in position. Replace contact plate as nearly as possible in its original position and partially tighten the four screws so that plate may be moved to its proper position.

If test lamp "YB" remains lighted when transmission is in neutral, move plate very slightly to the rear until lamp "YB" goes out. (If lamp "Y" remains lighted, move block forward.)

The proper setting is obtained when the movement of shift lever forward from neutral necessary to bring "YB" on, is equal to the backward movement required to bring lamp "Y" on. If the contact plate is not in proper position, the transmission will not come to true neutral and the cross shift cannot be made.

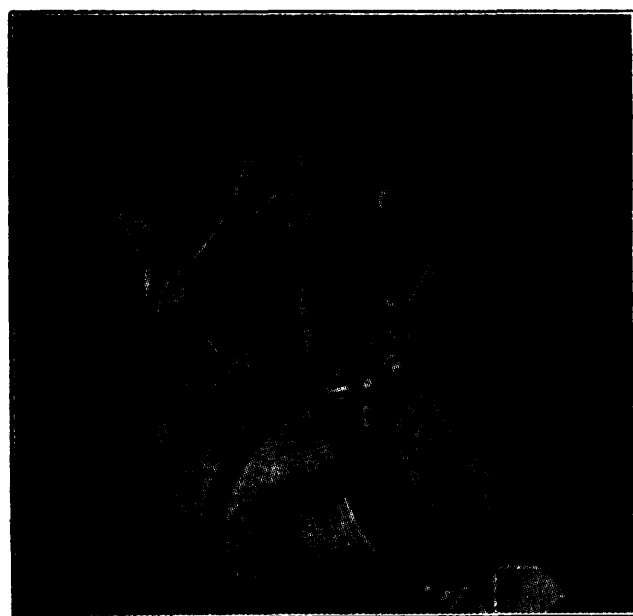


Fig. 10
Connection of Test Cable to Clutch Circuit Breaker.

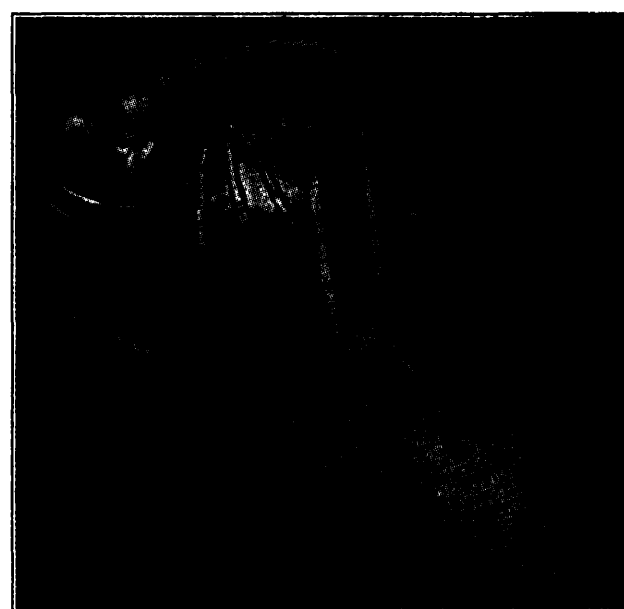


Fig. 11
Using Prods at Solenoid Terminals.

To Check Position of Interlock Switch

1—Place the transmission in low gear and the selector switch in high gear and depress the clutch. Lamp "Y" should light and remain lighted until the transmission is shifted (manually) to neutral. Lamp "YB" should be lighted when cross shift to second and high side is completed. If lamp "YB" is lighted before the cross shift is practically completed, the interlock switch is not in proper position and should be adjusted so that the pointer on its lever is in line with the mark on the housing when the transmission is in high gear. If adjustment does not give proper operation, replace the interlock switch.

If the above tests show that some circuits are not correct, replace the wires and switches assembly (lower harness with interlock switch and contact plate).



Fig. 12
Testing Circuits in Lower Harness and Switches. Insert shows Connection of Test Lamps to Lower Harness.

FAILURES RESULTING FROM FAULTY CIRCUITS.

See Wiring diagram, Fig. 7. A faulty selector switch may cause any of the failures listed below. A master selector switch should be used when checking the control. If control operates perfectly with master selector switch, an investigation of the other units is unnecessary.

Transmission fails to move into:	Faulty circuit through: (See Note)	Transmission fails to move out of:
Any position	Red Wire	Any position
Any position	Green Wire with Red Tracer	Any position—except that transmission may be brought to neutral by moving Selector Switch to opposite side of gate*
Low* Reverse	White Wire or Green Wire**	
Low High	Blue Wire**	
Neutral—except when Selector Switch is moved to opposite side of gate***	Black Wire	
Second Reverse	Brown Wire	
Second Reverse	Yellow Wire	Low High
Low High	Yellow Wire with Black Tracer	Second Reverse
Second High	Red Wire Green Tracer	
Certain positions unless started manually.	Transmission contact plate assembly. Surface of contact bars <i>must</i> be carefully cleaned.	Certain position unless started manually.
Transmission fails to follow a fast or "pre-selective" shift from a position on one side of gate to a position on the other side (from low to second, or from high to low, for example)	Black Wire with Yellow Tracer.	Transmission will follow when selector switch is moved very slowly

NOTE:—A faulty circuit may be caused either by a short or by an open circuit. In most cases, failure will be due to an open circuit, but when a short is encountered, the Master Selector Switch fuse will blow. When this occurs, lamp adjacent to fuse should burn at full brilliance. (A 6-8 volt, 32 CP, single contact bulb *must* be used. Allow Master Switch to remain in position which caused fuse to blow (i.e., in a position in which bulb burns at full brilliance). Check faulty circuit for a short. When short is located and eliminated, bulb will burn at approximately half brilliance—which is normal. After short has been eliminated, insert new 7½ ampere fuse and check operation of control in all positions.

(*) If green wire with red tracer is damaged, transmission will not move out of neutral position into any other position, but if it is placed in high position manually, it may be brought to neutral by moving Selector Lever into "Low." If placed in low position manually, it may be brought to neutral by placing Selector Lever in "high."

(**) If green wire is damaged, shift lever will still move back and forth with Selector Lever as the latter is moved from left to right.

If white wire is damaged, shift lever will remain on the second and high side, even though Selector Lever is moved back and forth from right to left.

(***) If black wire is damaged, it is impossible to place transmission in neutral by merely moving Selector Lever to "Neutral." However, if transmission is in either second or high position, it may be placed in neutral by moving Selector Lever to "Neutral" and then as far to the left as possible. Transmission may be moved into and out of every position, except neutral, in the normal manner.

AUTO-LITE VOLTAGE OPERATED TWO-STAGE CHARGE REGULATORS

6 Volt, TC-4100 Series Regulators (Early '34 With Three Windings).

6 Volt, TC-4100 Series Regulators (Late '34 With Two Windings).

6 Volt, TC-4200 Series Relay-Regulators (With Two Windings).

6 Volt, TC-4300 Series Relay-Regulators (With One Winding).

Auto-Lite voltage operated, two-stage charge regulators were first introduced on Hudson and Terraplane, as well as on Hupmobile automobiles, early in 1934. The first TC-4100 series regulators were made with three windings connected as shown in Fig. 1. This type of regulator was soon superseded by the two winding temperature compensated unit shown in Fig. 2. By using the bi-metal spring support extension on the armature, the point of "cutting in" and "out" is varied to meet the changing battery voltage characteristics, resulting from temperature changes.

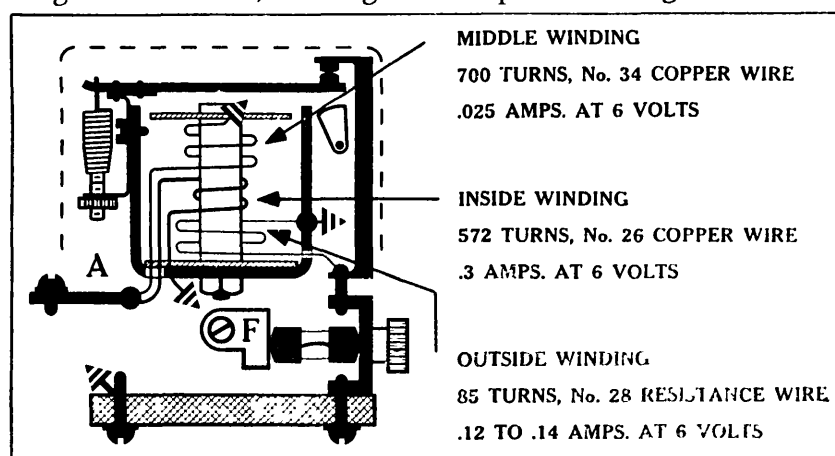


Fig. 1

Internal Circuits of the early Auto-Lite Type TC-4102-A Charge Regulator with Three Windings.

towards the core, which opens the regulator contacts. These contacts, of course, are in series with the field circuit, and when they are together, complete the field circuit directly to ground. With the contacts open the field circuit is completed to ground through a carbon composition resistance unit. In other words when the regulator points are touching together the field resistance unit is "shorted" out, but with the regulator points open the resistance is automatically placed in series with the field circuit, as the resistance unit actually is shunted or connected across the regulator points.

The regulator armature is held down, and the points remain open until such time as the generator voltage falls below the minimum value for which the unit is set (usually between 1.1 to 1.3 volts below the opening voltage), at which time the regulator points again close and the generator charging rate is automatically increased. From this explanation it will be seen that Auto-Lite two-stage charge regulators prevent the generator voltage from becoming abnormally high after the battery has reached a fully charged condition, providing the generator third brush is properly set, and all electrical connections are clean and tight.

TEMPERATURE COMPENSATION BY "MAGNETIC SHUNT"

By referring to Fig. 4 it will be seen that there is a metal bridge "M" supported by the top end of the magnet core "C", which reaches from one end of the "U" shaped regulator frame to the other. This metallic bridge is made of nickel-iron, an alloy which has the peculiar characteristics of being a better magnetic conductor when cold than when hot. Bear in mind that if current is put thru the voltage winding on core "C" in such a direction as to make the top of the core a magnetic north pole, the two ends of the regulator frame consequently become magnetic south poles. "Lines of force" flow from north to south, and without the nickel-iron magnetic shunt the path of the lines of force is thru the regulator armature. This, of course, results in the armature being attracted towards the core.

Now, when the nickel-iron magnetic shunt is placed across the ends of this electro-magnet, it supplies an additional path for these lines of force. When its temperature is low, or when it is cold, the magnetic shunt supplies a path for practically all of the

The two winding regulators have since been superseded by single winding units, with a "magnetic shunt" for temperature compensation, and are used on 1935 productions. Fig. 3 shows the internal circuits of the TC-4302-A relay-regulator used on the 1935 Packard "One Twenty" automobiles. A field fuse will be found in the base of all Auto-Lite charge regulators and combination circuit breaker and charge regulator units. While a $7\frac{1}{2}$ amp. fuse (type 1A- $7\frac{1}{2}$) was specified for use in the first regulators, we now find 5 amp. fuses (type 1A-5) specified for use in current production equipment.

OPERATION.

When the generator brush voltage builds up to a pre-determined value the magnetic pull on the regulator armature becomes sufficient to overcome the tension of the armature restraining spring, and the armature is attracted

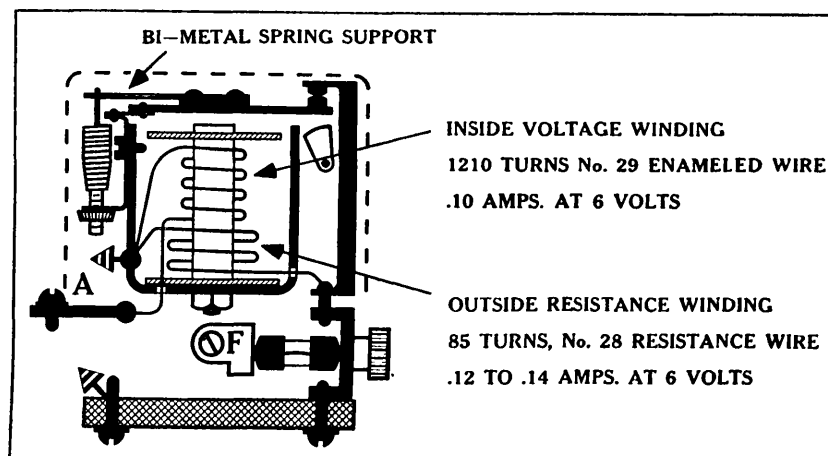


Fig. 2

Internal Circuits of the late Auto-Lite Type TC-4102-A Charge Regulator with Two Windings.

lines of force, thereby diverting them away from the regulator armature. This means that the armature is not attracted downwards towards the core, the regulator points do not open, and, as a result, the generator continues to charge at the high rate. When the magnetic shunt becomes warm or hot, its ability to conduct "lines of force" decreases, and the regulator armature then supplies the path, with a resulting early regulator action. To sum this explanation up in a few words would be to say that the regulator magnet is stronger when hot than it is when cold; consequently the points in the generator field circuit are opened sooner in warm weather than in cold weather.

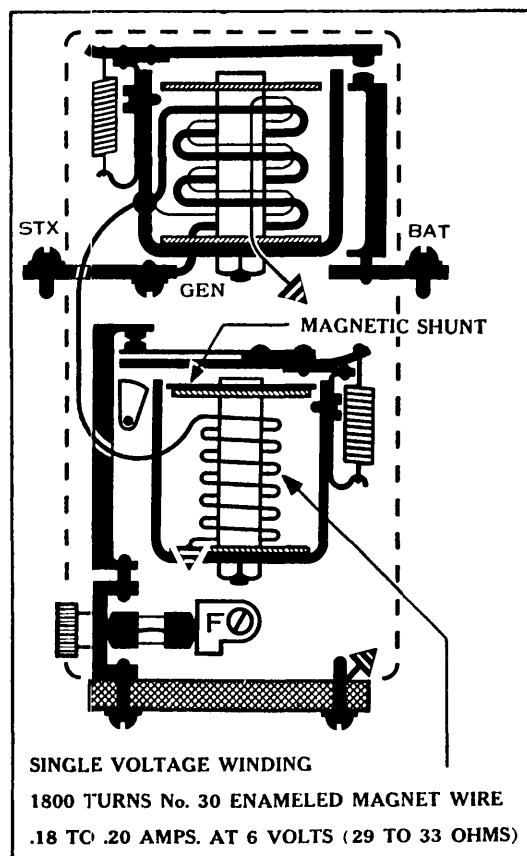


Fig. 3

Internal Circuits of the Auto-Lite Combination Relay Regulator used on the 1935 Packard One Twenty Automobiles.

To change the voltage at which the points open (high to low charge rate), adjust the armature spring tension by BENDING the lower spring bracket ("A", Fig. 5) to which the spring adjusting nut is soldered. Do not attempt to unsolder the nut. To change the voltage at which the points close (low to high charge rate), turn the brass cam ("B", Fig. 6), which serves as the lower armature stop and, therefore, controls the gap between the contact points when they are open. After adjusting apply a touch of air drying varnish to prevent any possibility of the cam slipping.

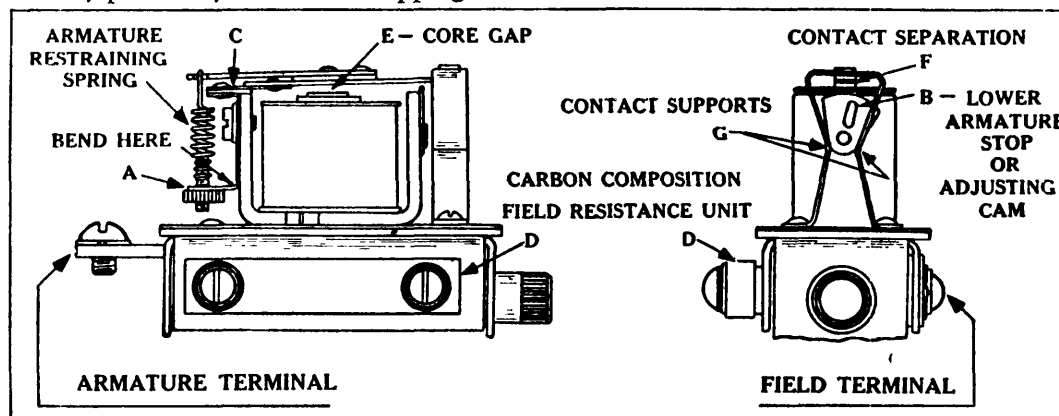


Fig. 5
Adjustments on the Auto-Lite Two-Stage, Voltage Controlled Battery Charge Regulators.

The core Gap ("E", Fig. 5) should be adjusted to .030 inch. This adjustment is made by expanding or contracting the stationary contact supporting legs ("G", Fig. 6). A core gap greater than specified tends to increase the temperature compensation, and reduces the pressure on the regulator points; while a smaller core gap tends to cause the points to open at lower voltages at extreme temperatures.

The contact separation ("F", Fig. 6), should be adjusted to not less than .005 inch when armature is pressed down against lower stop "B". (Measurements made on regulators in service show average adjustment to be .012 inch.) Contact tension, 1½ to 2 ounces, measured directly over frame of regulator which carries lower armature stop.

The necessity for temperature compensation on the regulator is brought about by changing battery characteristics. A battery requires a higher voltage for charging when cold than when warm. Based on a 20-ampere charge rate, the circuits of the voltage regulator are so balanced that the battery characteristics trail the regulator at a given voltage by approximately one-half a volt.

The voltage regulator also compensates the charging rate for increases in load. If the generator is operating on a low rate and a load slightly greater than the low rate is placed on the circuits, the regulator will immediately go to the higher rate due to the drop in voltage occasioned by the increase in electrical load.

There is approximately one volt difference in the generator output occasioned by the voltage regulator; that is, with the field resistance "cut out," the generator potential throughout its entire speed range is raised about one volt above that at which it would charge with the resistance cut in. The generator thereby carries the maximum current demands when these demands exist without forcing the battery to accept this high rate when fully charged, or when no current demands exist.

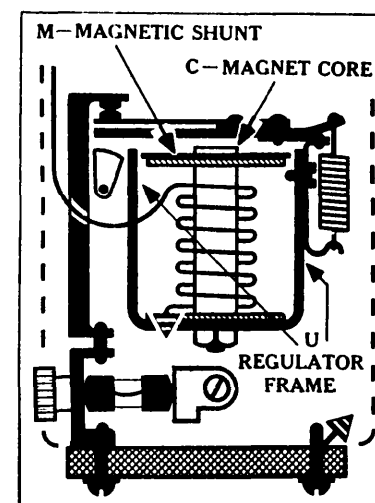


Fig. 4

The Auto-Lite "Magnetic Shunt" used for Temperature Compensation of the Regulator.

ADJUSTING.

TC-4100 series charge regulators and TC-4200 series combination circuit breaker and charge regulators should be adjusted to perform in accordance with the following table:

ROOM TEMPERATURE DEGREES F.	POINTS TO OPEN VOLTS
50	8.59
60	8.52
70	8.46
80	8.40
90	8.34
100	8.28
110	8.22
140	8.05

Closing voltage should be below opening voltage by 1.6 to 1.8 volts for any given temperature.

TC-4304 and TC-4304-A only (Hudson and Terraplane 1935) combination circuit breaker and charge regulators should be adjusted to the following specifications and perform in accordance with the table below:—

NICKEL-IRON COMPENSATED.

Core Gap—.020 inch (contacts closed).
Contact Separation—.005 inch (minimum).
Contact Spring Tension—10 to 12 oz.

ROOM TEMPERATURE DEGREES F.	POINTS TO OPEN VOLTS
50	8.14-8.64
60	8.07-8.57
70	8.00-8.50
80	7.93-8.43
90	7.86-8.36
100	7.79-8.29
110	7.72-8.22
140	7.50-8.00

Closing voltage should be below opening voltage by 1.1 to 1.3 volts for any given temperature.

TC-4300 series (all others) combination circuit breaker and charge regulators should be adjusted to the following specifications and perform in accordance with table below.

NICKEL-IRON COMPENSATED.

Core Gap—.020 inch (contacts closed).
Contact Separation—.005 inch (minimum).
Contact Spring Tension—10 to 12 oz.

ROOM TEMPERATURE DEGREES F.	POINTS TO OPEN VOLTS
50	8.6-9.1
60	8.52-9.02
70	8.45-8.95
80	8.38-8.88
90	8.30-8.80
100	8.23-8.73
110	8.16-8.66
140	7.95-8.45

Closing voltage should be below opening voltage by 1.1 to 1.3 volts for any given temperature.

The following resistance units are available and are marked as shown in the table below.

PART NO.	RESISTANCE	MARKED
TC-51	1.85 to 2.10 ohms	1.85
TC-51A .....	.90 to 1.1 ohms	1
TC-51B	2.75 to 2.95 ohms	2.85
TC-51C	30 to 34 ohms	32
TC-51D	158 to 162 ohms	160
TC-51E	1.0 to 1.2 ohms	1.1
TC-51F	295 to 305 ohms	300

LEECE-NEVILLE VOLTAGE REGULATOR

TYPE 23-R, DESIGNED FOR USE ON 6 TO 8 VOLT GENERATORS.

The type 23-R Leece-Neville regulator is a voltage regulator in the strictest sense of the word. Not only will this unit maintain a constant line potential under all ordinary operating conditions but, in addition, will continue to maintain the correct line voltage even though the battery should become disconnected and the generator run on an "open circuit".

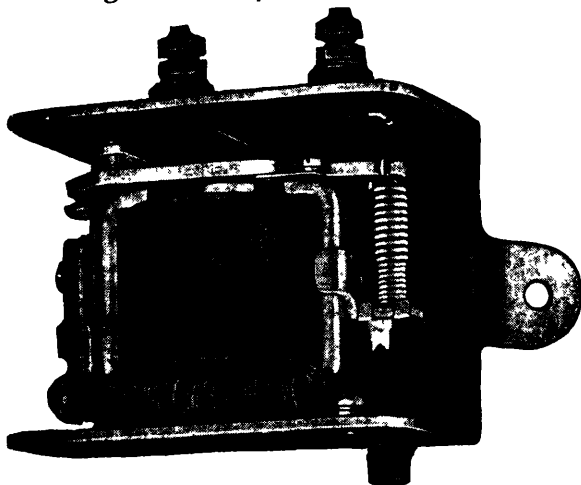


Fig. 1

The Leece-Neville, Type 23-R, Voltage Regulator with Cover Removed.

Contacts "UC", as well as the control resistance, are connected in the generator field circuit in such a way that when the contacts are closed, the resistance is "shorted" out of the field circuit, but when the contacts are open, resistance is placed in the field circuit. With resistance "out" of the field circuit, the generator field strength is comparatively high and, consequently, the generator brush voltage will be its highest, but with the resistance "in", the field strength is comparatively low; therefore, the generator brush voltage will be at its lowest value. In actual service, however, neither of these extremes are permitted to exist because the vibrating regulator armature opens and closes contacts "UC" which alternately cuts the controlling resistance "in" and "out" of the generator field circuit. A strong spring tension will cause the contacts to remain closed longer than a weak spring tension; therefore, the brush voltage will be raised by tightening the spring, lowered by weakening the spring. In this manner, the generator voltage can be adjusted to any desired value.

OPERATION.

To explain the operation of this regulator we will begin with the upper contacts "UC" closed, as shown by Fig. 3. The upper contacts "UC" are held together by the spring "S" and, therefore, the control resistance is not in use until the generator voltage rises sufficiently to establish enough magnetic pull to overcome the tension of the armature restraining spring "S". Current from the generator flows thru both the primary and secondary coil windings, which are wound so that their magnetic fields assist one another, or are additive. The primary or voltage winding is across full generator voltage (because the winding is shunted across the two main brushes), and is so connected in order to establish a magnetic field that will vary as the generator brush voltage varies. When the generator brush voltage starts to build up or increase, the magnetic pull of the primary coil increases, and overcomes the spring pull, thus opening the upper contacts "UC", but at the instant the contacts "UC" open, control resistance is introduced into the generator field circuit to lower the field current; consequently, the generator brush voltage is lowered and, at the same time, the primary magnetic pull decreases, and the spring again pulls upper contacts "UC" closed. This cycle repeats rapidly, and thus prevents the generator brush voltage from increasing to values above that for which it is adjusted.

The secondary winding is connected across generator full voltage when the contacts "UC" are closed. When the contacts "UC" are open the control resistance is in series with the secondary coil, as well as with the generator field windings. For convenience let us assume that the insulated main brush "B", Fig. 3, is positive. The third brush will also be positive. This means that current

Figure 1 shows a Leece-Neville regulator with the cover removed, while Fig. 2 shows the internal circuits, as well as the places where the various wires are connected or soldered. The inside or "primary winding", so called (which actually is the voltage winding and which, at all times, is shunted directly across the two main generator brushes), consists of 10 layers of No. 24 enameled magnet wire (450 turns) and 1 layer of No. 26 resistance wire (45 turns), making a total of 495 turns. This winding has a resistance of approximately 13 ohms and on test will pass .45 amps. at 6 volts.

The outside or secondary winding consists of 90 turns of No. 26 enameled resistance wire, which has a resistance of from 32 to 36 ohms and on test will pass approximately .17 amps. at 6 volts. The regulator armature carries two contacts which line up with two stationary contacts. By referring to Figs. 3 and 4 it will be seen that these two sets of contacts have been labeled "UC" (upper contacts) and "LC" (lower contacts).

Normally, upper contacts "UC" are in use, so that when the regulator armature vibrates, contacts "UC" are alternately opened and closed very rapidly.

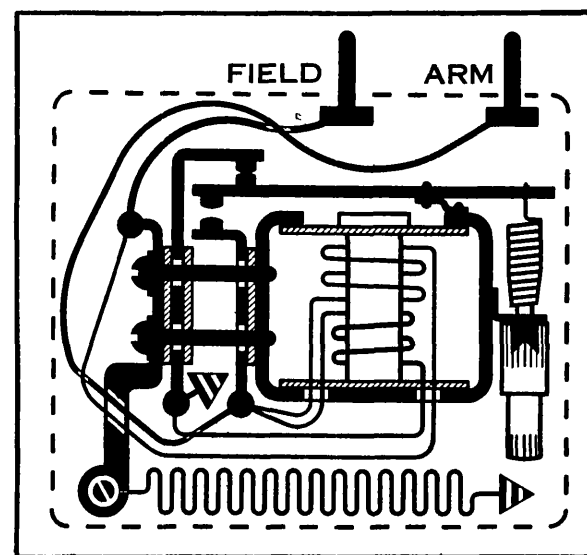


Fig. 2

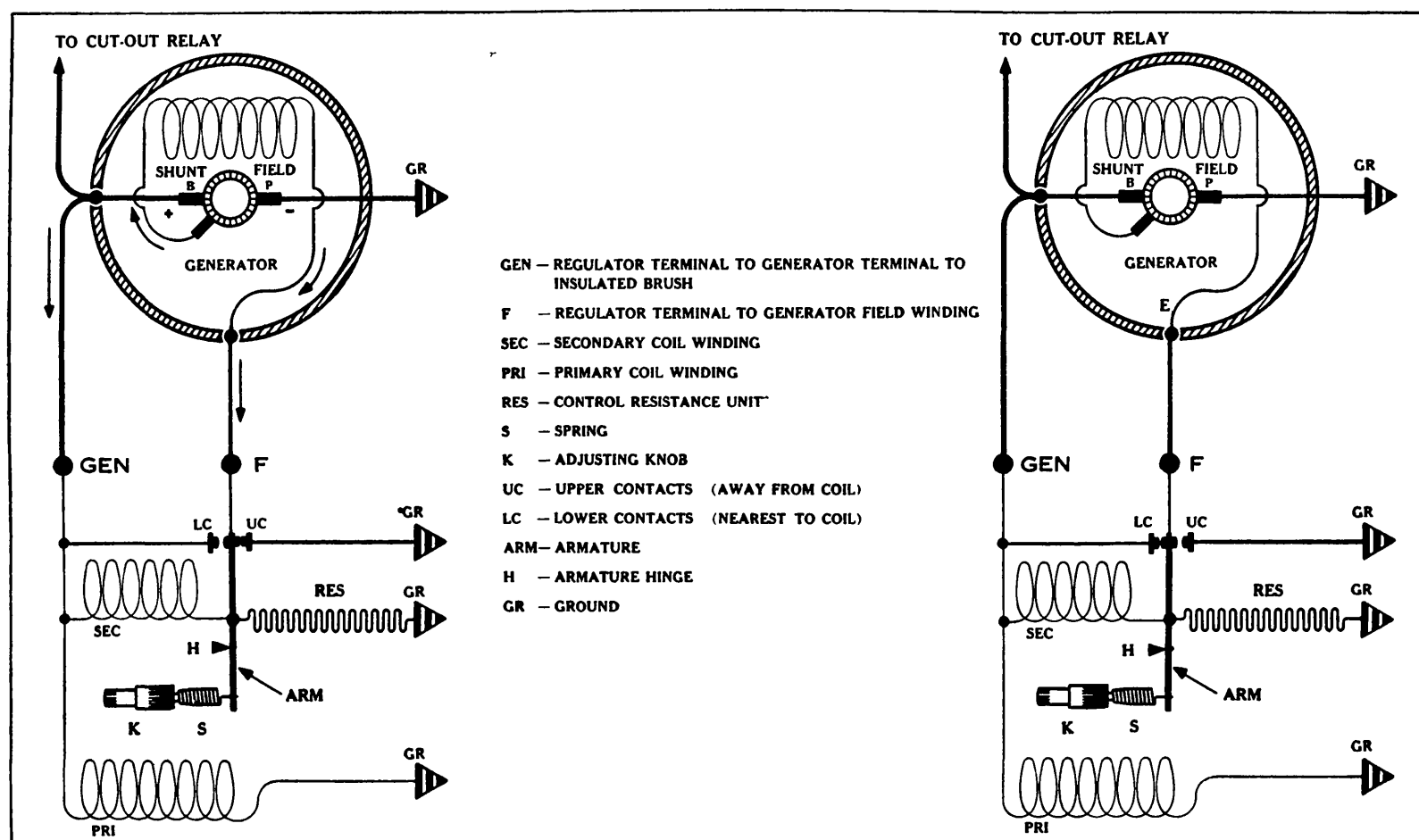
Internal Circuits of the Type 23-R Regulator.

from one polarity (positive) is flowing thru both the generator field and thru the secondary winding on its way to the negative brush (ground), and whether it will go to ground by way of contacts "UC" or thru the control resistance depends upon whether contacts "UC" are closed or open.

The voltage across the two main brushes of any generator is always higher than the voltage across the third brush and the main brush of opposite polarity, and this difference increases as the third brush is moved farther and farther away from the main brush of like polarity. This means that the voltage across the generator field is different (less) than across the secondary winding, and consequently there is a difference in voltage in favor of the secondary.

At the instant voltage across the generator field increases or decreases, there is corresponding increase or decrease in voltage across the secondary coil, and the differential in voltage ("bucking") sets up a secondary winding magnetic pull, which results in a steady vibratory beat, and increases the frequency of the regulator armature vibrations. Variations in generator brush voltage immediately result in a vigorous magnetic response from the primary winding and, when combined with the very sensitive differential reaction of the secondary winding, the resulting magnetic response to voltage variations produces instantaneous generator voltage regulation.

The voltage not only is smoothed out or made free from fluctuations, as indicated by suitable electrical instruments, but the voltage is maintained practically constant over a useful range of speeds and loads. The preceding action takes place in relation to upper contacts "UC", and continues until the battery becomes fully charged, at which time the regulating action is transferred to the lower contacts "LC". Should the battery, for any reason, become disconnected from the line, or in some instances when the generator speed is excessive, the regulating action is transferred to the lower contacts before the battery is fully charged.



Schematic Diagram Showing the Leece-Neville, Type 23-R Voltage Regulator and a Generator.

Fig. 3

Regulator Armature in "Up" Position
and Upper Contacts "UC" Closed.

Fig. 4

Regulator Armature in "Down" Position
and Lower Contacts "LC" Closed.

LOWER CONTACTS "LC", FIG. 4.

Any one or any combination of the preceding conditions (that is, a fully charged battery, an open circuit, or excessive generator speeds), tends to increase the generator voltage above values encountered when the regulation is being done on upper contacts "UC". This higher voltage increases the magnetic pull of both the primary and secondary windings sufficiently to pull the regulator armature in a position to operate on lower contacts "LC". The transfer of regulation from the lower contacts is fairly prompt.

By referring to Fig. 4 it will readily be seen that when the lower contacts "LC" momentarily close, four important events will take place simultaneously.

1. The control resistance is placed across the generator main brushes, which, in effect, places an additional load on the generator, and has a tendency to "kill" the generator brush voltage.
2. The control resistance is momentarily placed in series with the generator shunt field winding which, of course, weakens the magnetic strength of the generator field, and still further assists in reducing the brush voltage.
3. The end of the shunt field winding marked "E" is, in effect, momentarily connected to the insulated main brush "B" (or, in other words, both ends of the shunt field are connected to brushes of the same polarity) which results in a momentary complete collapse of the generator field circuit.
4. What is most important of all, the secondary winding is momentarily short circuited out of action by the closing of the lower contacts "LC". This means that the secondary winding no longer will have any magnetic strength to help hold the regulator armature down and, of course, the lower contacts will immediately open.

The combination of the above four events results in a rapid vibration of the regulator armature which makes it possible to prevent the generator brush voltage from rising above the range for which the regulator is adjusted. When the lower contacts "LC" again open, the control resistance is placed in series with the generator field winding and the secondary winding, thereby introducing the differential ("bucking") action previously described. The primary winding effect is the same whether operation is on lower or upper contacts; therefore, with variations in generator voltage the combined effect of the primary and secondary windings causes the regulator armature to vibrate rapidly on the lower contacts "LC" with steady rapid frequency similar to that on upper contacts "UC" and voltage regulation is accomplished as before.

CONCLUSION.

After contact and magnetic gaps are adjusted at the factory, (both upper and lower contacts are .018 to .020 inch) voltage adjustment is accomplished solely by means of spring "S" and adjusting knob "K". Balancing of the spring pull against the magnetic pull determines the time interval of contact dwell either open or closed, resulting in a corresponding change in voltage values. Use of a low control resistance in the circuit, as described, results in a lower current flow thru the contacts; consequently, the contacts will last longer than if a high control resistance were used. The Leece-Neville 23-R regulator can be used on all 6 to 8 volt generators which have a shunt field draw of up to five amperes, which means that these units can be installed on all 1934 and 1935 American pleasure cars, as no original equipment generator, for those years, has a field current in excess of the specified 5 ampere safe limit.

We find the modern trend is to regulate line voltages by connecting voltage regulators, either to the coil side of the ignition switch or to the low tension "input terminal" of the ignition coil. These regulators may be used in this manner, by simply running a wire from the "Gen" terminal on the regulator to the "dead side" of the ignition switch, instead of to the generator terminal, as shown by Figs. 3 and 4. The field connections are the same in either case.

Delco-Remy Combination Vibrating Point Current and Voltage Regulators

USED ON 1935 LA SALLE AND OTHER AUTOMOBILES.

The Delco-Remy Current and Voltage Regulators are made up of three separate units, a cut-out relay, a vibrating point current regulator and a vibrating point voltage regulator (see Fig. 1). All of the units are mounted on a single base and enclosed under a dust and moisture-proof cover. The current and voltage regulators are designed for use with two-brush generators, and must be mounted in a position, such as on the engine side of the dash, to prevent engine vibrations from affecting the operation of the vibrating contact points within the regulators.

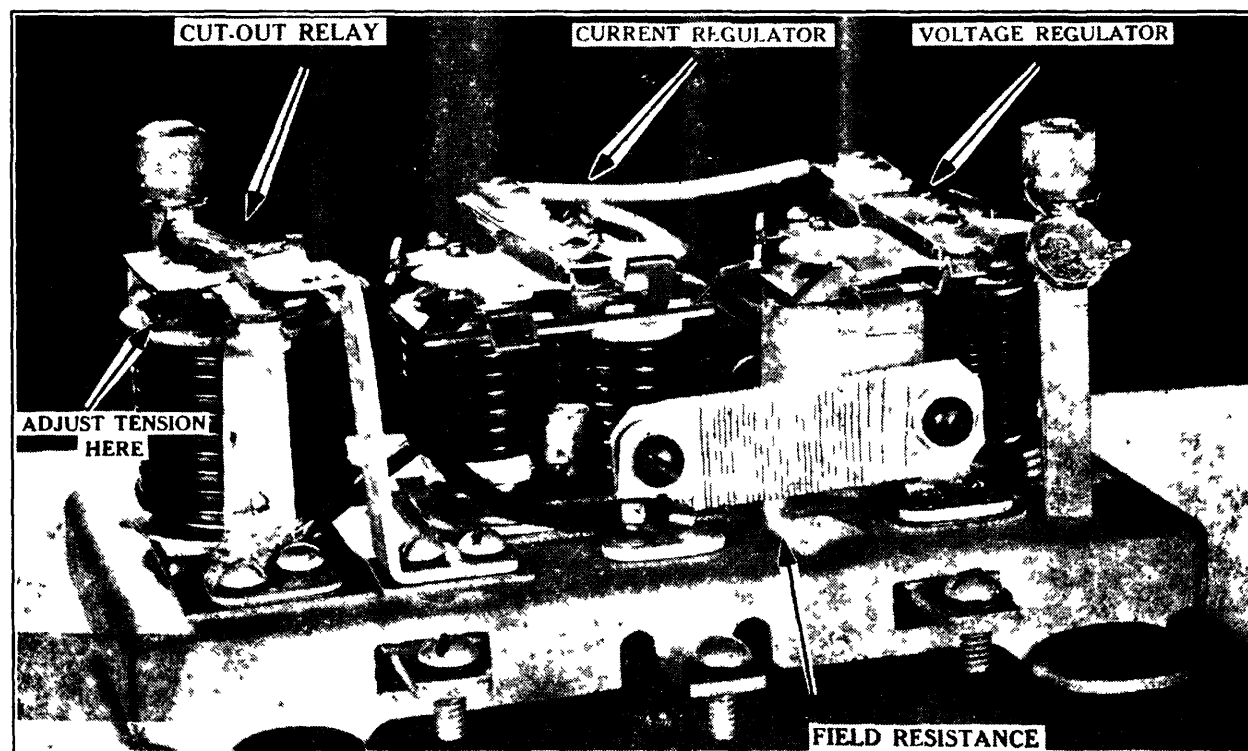


Fig. 1
Delco-Remy 5559 Combination Vibrating Point Current and Voltage Regulator used on 1935 LaSalle Automobiles.

The current and voltage regulator will safely limit the output of the generator in accordance with battery requirements and the connected load, such as lights, heater and radio, provided the units within the regulator are set to the proper specifications. If the battery is in a fully charged condition and there is no electrical load except the ignition and gas gauge, the voltage regulator unit reduces the output of the generator to a low value to just meet the ignition requirements, and to compensate for the current used in starting. If the electrical load is increased, or the battery is partially discharged, the voltage regulator unit automatically allows the output to increase to meet the additional load.

OPERATION.

CUT-OUT RELAY. The cut-out relay is of the standard type, excepting that it has an improved series winding to adequately carry the heavy current of the high-capacity generators. The upper or auxiliary contacts, mounted on top of the armature of the cut-out relay, are not part of the generating system. This set of contacts provides a definite ground connection for the solenoid relay when the automatic solenoid type of starting system is used. The solenoid relay on the starting motor is grounded to the regulator terminal stamped "R", (relay), which terminal is used only with this type of starting system.

CURRENT REGULATOR. The current regulator is composed of a heavy winding connected in series with the generator charging circuit. The contact points are normally held in a closed position, due to the tension on the regulator armature by the armature restraining spring. When the generator output reaches a predetermined value, the magnetic pull on the armature overcomes the spring tension and the contact points open which inserts a high resistance in the generator shunt field circuit. This resistance in the field circuit reduces the generator output so that the spring tension closes the contacts and the output again increases. The armature vibrates many times per second, resulting in a practically constant generator output at all speeds, provided that the generator is being driven at a speed fast enough to enable it to reach its maximum output. The maximum output of the generator depends upon the adjustment of the current regulator and a regulator should never be set to exceed the specified output of the generator.

VOLTAGE REGULATOR. The construction of the voltage regulator unit is similar to the current regulator except that one of the cores (the voltage winding) is wound with a large number of turns of small wire connected between ground and the gas gauge terminal on the ignition coil, or the "off" side of the ignition switch. The current in this winding varies with the line voltage. Whenever the generator voltage reaches a predetermined value, the magnetic pull on the armature overcomes the spring tension, and the con-

tact points open, inserting a resistance into the shunt field circuit of the generator. As soon as the contacts open, the voltage immediately drops and the regulator points again close. This cycle occurs many times a second, resulting in a generator voltage that is held practically constant.

Because the voltage coil of the regulator is connected at the "off" side of the ignition switch, or the gas gauge terminal on the ignition coil, which is practically at battery voltage, the regulator regulates the line voltage, thus eliminating the effect, due to line drop between the generator and battery with varying amounts of current flowing. There are a few turns of heavy wire around the other core of the voltage regulator unit, which are connected in series with the generator shunt field circuit. The windings are placed on this core in a way so as to assist the main or voltage winding in magnetizing the cores. When the voltage regulator contacts open, the current in this aiding coil is immediately reduced to zero, thus enabling the contacts to quickly close and, in this way, they increase the speed of vibration of the contact points.

TROUBLE SHOOTING.

1. GENERATOR NOT CHARGING.

(a). Check the mounting of the regulator unit to determine if the terminal marked "GRD" is properly connected to a good ground. On the 1935 La Salle this group is made under the starting motor solenoid base screw.

(b). Temporarily ground the regulator terminal marked "F", and gradually increase the engine speed to determine if the generator is producing its rated output. (Do not drive the generator at a high speed while making this check, or damage may result, as there will be no current regulation with the "F" terminal grounded, and the generator output may reach an exceedingly high value.) If the generator charges satisfactorily with the "F" terminal grounded, the trouble is in the regulator, and it should be replaced or adjusted.

(c). If the generator does not charge with the "F" terminal grounded, remove the lead from the "GEN" terminal, and strike it against a ground, such as the motor block, while the "F" terminal is still grounded. If no spark occurs, the trouble should be looked for in the generator. If a spark does occur, the cut out is probably at fault.

2. GENERATOR CHARGING TOO HIGH OR TOO LOW.

(a) If the generator charging rate is too high or too low, check the adjustments of the voltage and current regulators. Voltage regulator readings must be taken with the regulator both cold (70° F.) and hot (150° F. or very hot to the hand) to be sure it is properly adjusted. With generator charging 8 to 10 amperes, the regulator voltage should be 7.2 to 7.4 volts at 150° F., and at 70° F. voltage should be 7.3 to 7.6 volts for the Model 5587 unit and Model 5596. For regulator Model 5559, the voltage should be 7.4 to 7.6 volts at 150° F. and 7.7 to 8.0 volts at 70° F. Use a Model 100, "A.V.R." Electro-Check meter, with its variable resistance connected in the charging circuit, to maintain the 8 to 10 ampere output, while the check is being made. If the charging rate is less than 8 amperes, with all the resistance out of the circuit, discharge battery by cranking engine for a short period.

(NOTE: Insert the resistance in the "BAT" circuit between the regulator and dash ammeter. Disconnect the "IGN" lead from the regulator terminal and temporarily place a jumper lead from this terminal to the "BAT" terminal, while making this adjustment.)

Regulator voltage should be checked by connecting the "A.V.R." voltmeter between the terminal marked "IGN" and a convenient ground. After the regulator has reached the proper temperature, retard the speed of the generator until the cut-out relay contacts open. Then increase the generator speed to between 2000 and 3000 R.P.M., and proceed with voltage check with 8 to 10 ampere output maintained by varying the resistance.

(b). The current regulator may be checked by turning on the lights, and other accessory load, so that the amount of current flowing will exceed the adjustment of the current regulator. Disconnect lead from "IGN" terminal, and tape the end. Slowly increase the speed of the generator until the current remains constant. Under this condition, the output of the generator will be the amount for which the current regulator is adjusted. The current value may be checked by connecting the "A.V.R." ammeter in series at the regulator terminal marked "BAT" (or "AMM"). A sulphated battery or a loose or high resistance connection in the charging circuit may cause a low charging rate to a discharged battery.

When repairs to the regulator are to be made, the following adjustment procedure should be followed:

ADJUSTMENTS.

1. CUT-OUT RELAY.

With the points closed the air gap between armature and core should be .018" to .022". Contact point opening should be .018" to .025". The point opening is adjusted by bending the upper contact support, carrying the upper auxiliary relay contact. Relay contacts should close at 6.75 to 7.5 volts and open with a reverse current of 0 to 3 amperes at 6.3 volts. Relay voltage should be checked between "GEN" terminal and a convenient ground. The generator output should be checked with an accurate reading ammeter connected in series at the regulator terminal stamped "BAT" (or "AMM"). The upper contacts should separate when a minimum force of 6 ounces is applied at the relay contacts on the armature. The tension (See Fig. 1) is adjusted by bending the spring post.

2. VOLTAGE REGULATOR.

Contacts should be adjusted to meet squarely, and with a pressure of 2.7 to 3.5 ounces. Adjust pressure by bending the contact spring carrying the upper contact. (Check pressure at a point opposite the contacts (See Fig. 2) and at the instant the points separate.) With the fiber bumper barely touching the contact spring post, the air gap between armature and center of core should

be .060" to .070". If it is impossible to secure the proper cold and hot regulator voltages, the air gap may be decreased to lower the cold setting with respect to the hot setting, or increased to increase the cold setting with respect to the hot setting. Adjust the air gap by bending contact spring post. Adjust lower armature stop so that points will open .015" to .025" with the armature down. Adjust the upper armature stop so that when the armature is up there will be a clearance of .008" to .013" between fiber bumper and its stop.

Set the regulator voltage to the specifications given above. The voltage is regulated by slightly bending the lower spring hanger. Increasing the spring tension increases the voltage, and decreasing the spring tension decreases the voltage setting. In some cases, when adjusting regulator voltage, the spiral spring does not have enough tension to hold it in position. When this occurs, reduce tension of upper contact spring but not less than 2.7 ounces. Excessive sparking at the contacts, and erratic operation, may be due to low tension on upper contact spring or misalignment of contact points. Excessive sparking may, in time, oxidize the contact points to such an extent as to cause high resistance and prevent the generator from charging. This may be checked by bridging the contacts of either the current or voltage regulator. If this will allow the generator to charge, the contacts should be cleaned with a thin fine-cut contact file to eliminate this condition. (CAUTION: DO NOT USE FILE EXCESSIVELY ON THE SMALL CONTACT AS THE ACTUAL CONTACT MATERIAL IS ONLY A FEW THOUSANDTHS OF AN INCH THICK.) Never use sandpaper or emery cloth when cleaning contacts.

3. CURRENT REGULATOR.

The air gap should be .070" to .080", and the point openings, etc., should be adjusted to the same values as given for the voltage regulator. The current output is adjusted to 20-22 amperes, and is regulated by bending the lower spring hanger.

4. Voltage test readings must be made with the regulator cover in place, and when checked on a test bench, the regulator should be in the same position as it is when mounted on the car (i.e. horizontal or vertical), and the base must be grounded. After making adjustments, and before a test reading is taken, the generator must be reduced in speed until the relay contacts open, and then increased to between 2000 and 3000 R.P.M. to take the test reading.

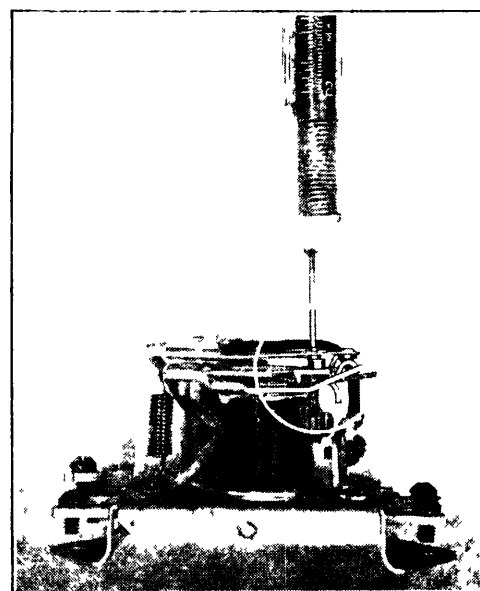


Fig. 2
Measuring the Regulator Point Tension. The tension is measured at a place opposite the Contact Points.

INSTALLATION CAUTION.

If the polarity of the generator is reversed, the cut-out relay contacts will not close but will vibrate and burn. To avoid the possibility of accidentally reversing the polarity of the generator, the "GRD" terminal should always be connected FIRST and disconnected LAST. To eliminate any doubt as to the polarity of the generator, the "GEN" and "BAT" (or "AMM") leads, at the regulator, may momentarily be connected together, thereby shorting out the cut-out relay. This will automatically give the generator its correct polarity. TO AVOID DAMAGE TO THE REGULATOR DO NOT RUN OR TEST GENERATOR ON AN OPEN CIRCUIT; THAT IS, WITH THE BATTERY DISCONNECTED FROM THE LINE.

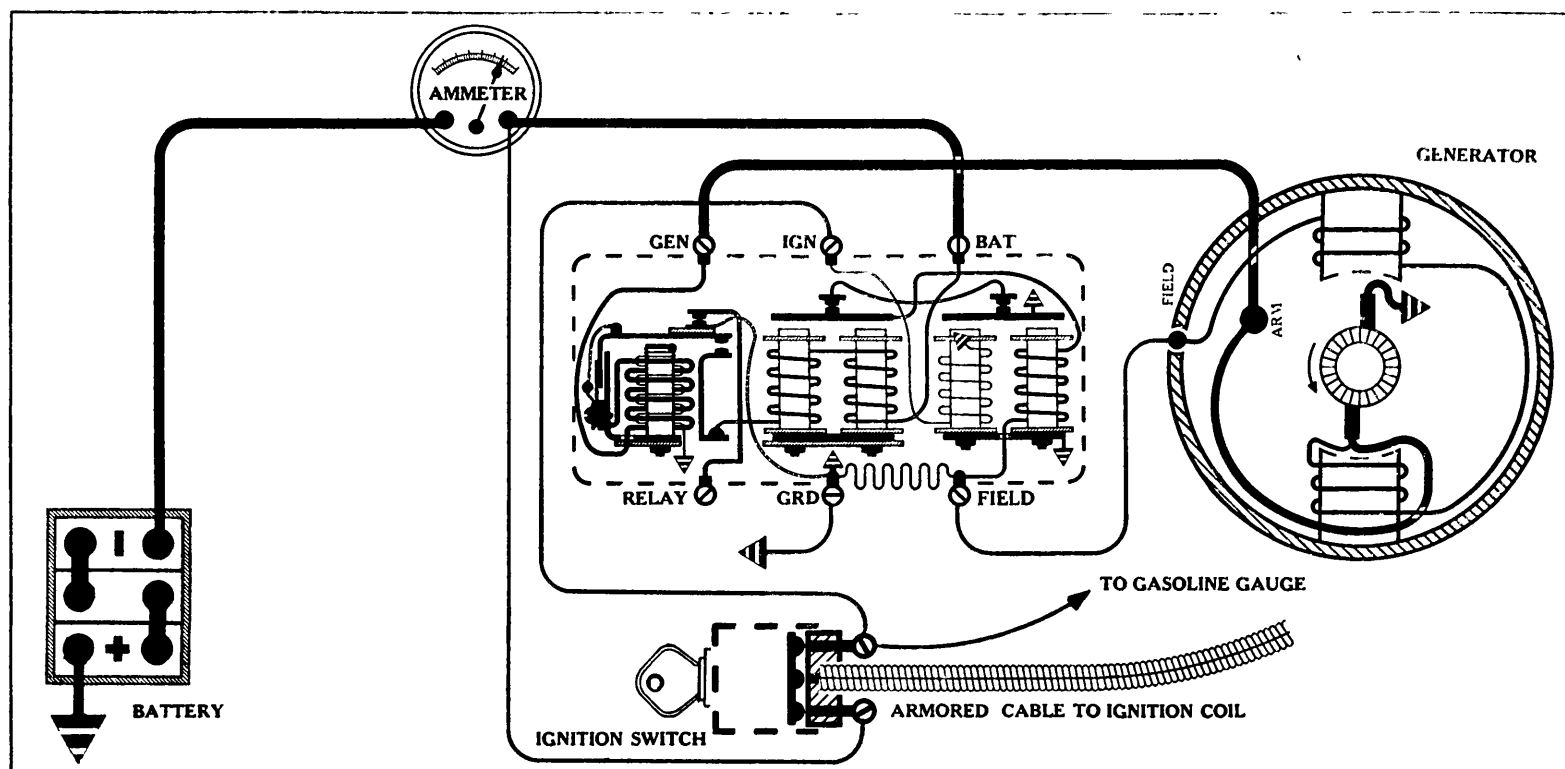


Fig. 3

Circuit Diagram of 1935 LaSalle Generator and Regulator.

DELCO-REMY VOLTAGE REGULATORS USED ON 1935 PONTIAC AUTOMOBILES

In making voltage regulator adjustments the work should be considered as two separate and distinct operations. The first part is purely mechanical; that is, accurately measuring the several gaps as well as the contact spring tension, to determine if all values fall within certain fixed limits specified by the manufacturers. These preliminary adjustments are extremely important, and should be carefully made, as it will be found impossible to complete the second part of the work; that is, adjusting the unit to give proper regulation when tested with a generator (either in a test bench or on the car), if any of the first measurements are wrong.

In checking and making preliminary adjustments a mechanic will require suitable thickness gauges. We recommend the Starrett No. 571 IGNITION SPACING GAUGE, priced at \$1.25. This precision tool was developed expressly for work of this sort. For measuring the regulator contact spring tension a mechanic will require an accurate spring tension scale graduated in quarter ounces. For this work we recommend the "Midget" Pocket Scale, priced at \$2.25.

The final regulator adjustment is made in conjunction with the generator, while running under actual operating conditions. A mechanic will require an accurate voltmeter, graduated to read within tenths of a volt, an accurate ammeter with a thirty ampere scale, and a variable resistance of suitable capacity, which is connected in series with the generator charging line, between the terminal on the regulator unit, marked "BAT" and the car ammeter. While a separate voltmeter, ammeter, and resistance may be used, we strongly recommend the purchase of a combination of these three units grouped on one panel. The Model 100, "A. V. R." ELECTRO-CHECK METER, priced at \$29.50 and distributed by the United Motors Service, Inc., the Hoyt GENERATOR AND VOLTAGE REGULATOR TESTER, priced at \$19.00, or other similar pieces of portable testing equipment are ideal for making regulator adjustments.

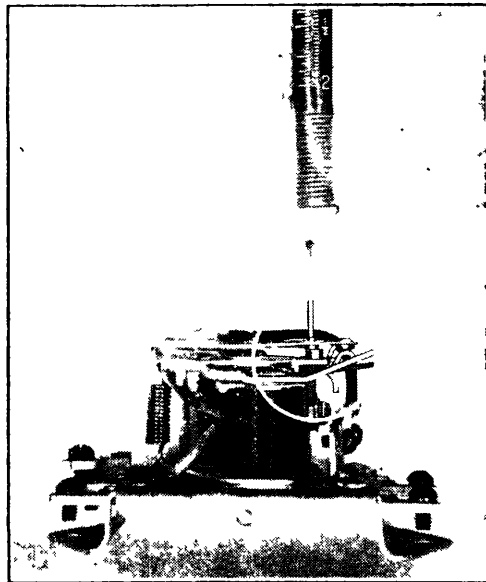


Fig. 1
Measuring the Regulator Point Tension. The tension is measured at a place opposite the Contact Points.

the air gap between the hinged armature and center of the magnet core should be between .060 and .070 inches. (In measuring the air gap with a Starrett No. 571 thickness Gauge, use the three leaves stamped .018, .020, and .022 for .060 inch; or leaves stamped .020, .022, and .025 for .067 inch). Adjust the air gap by slightly bending contact stop.

NOTE: Later, when final regulator adjustments are made with a volt and ammeter, under actual operating conditions, and it is found impossible to secure proper cold and hot voltage regulation, the air gap may be slightly decreased to LOWER the cold setting with respect to the hot setting, or increased to *increase* the cold setting with respect to the hot setting.

GAP BETWEEN FIBER BUMPER AND STOP.

4. The hinged armature should next be released, and the gap between the fiber bumper and its stop measured to see if it is within the limits of from .008 to .013 inches. (See Fig. 3). If not, adjust by bending UPPER ARMATURE stop.

Procedure for making Regulator Adjustments:—

REGULATOR POINTS.

1. Clean regulator contacts with a thin, fine cut, contact file (CAUTION! Do not use file excessively on small contact, as actual contact material is only a few thousandths of an inch thick. Never use sandpaper or emery cloth.)

REGULATOR POINT TENSION.

2. Adjust regulator contacts to meet squarely, and with a pressure of from $2\frac{3}{4}$ to $3\frac{1}{2}$ ounces. Adjust pressure by carefully bending the flat spring which carries the upper contact and fiber bumper. The contact tension should be read the instant the points separate, using a scale hooked to spring at point directly in line with contacts. (See Fig. 1.) (The scale should not be hooked at end of spring near fiber bumper.)

AIR GAP.

3. Press down on hinged armature (See Fig. 2), until fiber bumper on end of top regulator contact spring just barely touches the contact spring stop. In this position

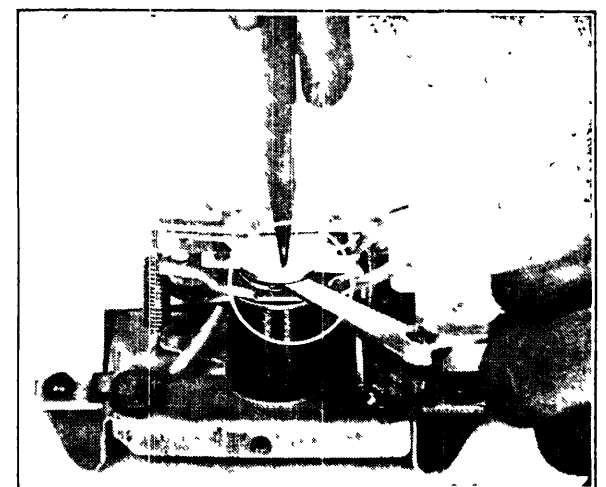


Fig. 2
Measuring the Regulator Air Gap. The Armature is pressed down until Fiber Bumper just touches stop when this measurement is made.

CONTACT SEPARATION.

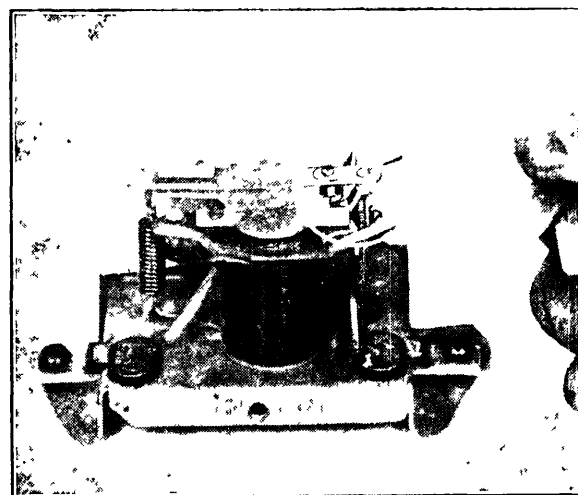
5. The hinged armature should now be pressed down until it touches LOWER ARMATURE stop (See Fig. 4). With armature in this position the regulator point separation should be from .018 to .025 inches. If adjustments are found necessary they should be made by bending the lower armature stop.

This completes the mechanical adjustments of the regulator, and it is now ready for final setting under operating conditions.

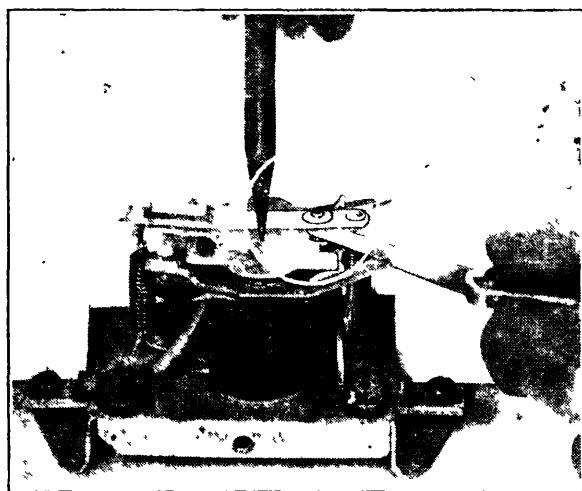
HOW TO CHANGE REGULATOR VOLTAGE.**IMPORTANT!**

All regulator voltage readings should be taken with regulator cover in place. This is important, as there is a great difference between regulator characteristics taken with the cover off and with the cover on. If these tests are made at a test bench the regulator should be placed on its base, or in the same position as it is when on the car. The regulator base must be grounded to the generator it is regulating. This type of voltage regulator should never be operated on an open circuit, as they are not designed for service of this type.

Regulator operating voltages are increased or decreased by bending the spiral spring hanger (See Fig. 5) to which the lower end of the spring is hooked. Bending the support down increases the spring tension, and increases the line voltage. Decreasing the spring tension decreases the voltage setting. Voltage readings should be taken with the regulator both cold (70° F.) and when hot (150° F., or when the unit feels very hot to the hand).

**Fig. 3**

Measuring Gap between Fiber Bumper and its Stop.

**Fig. 4**

Measuring the Contact Separation with Armature pressed down against Lower Stop.

Adjusting Regulator Voltage while Unit is on Car.**REGULATOR GROUNDED TO BRACKET.**

1. Before making any regulator adjustments the regulator base should be checked with a voltmeter to make certain that there is a perfect ground connection to frame of car. Connect one voltmeter lead to the engine block or other suitable ground, and touch the other voltmeter lead to the "AMM" terminal on regulator. Voltmeter should show line voltage. (This connection is made only to show if voltmeter is connected correctly). Start engine and let it idle at a fair speed, or fast enough to show "charge" on the car ammeter. Touch other voltmeter lead to metal base of regulator unit. If unit is properly grounded the meter will show no reading whatsoever. If the regulator has a poor ground it will be indicated by a reading on the voltmeter. After making this test stop the engine.

CONNECT "A.V.R." ELECTRO-CHECK OR SIMILAR TEST APPARATUS.

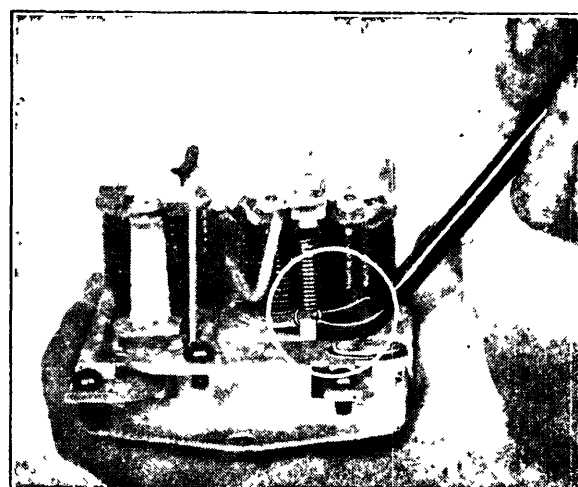
2. Connect one lead of the voltmeter to the engine block, or other suitable ground, and connect other voltmeter lead to terminal marked "GEN" on regulator unit.

3. Disconnect wire on car, which is attached to the "IGN" terminal on regulator, and tape end of wire to prevent a short circuit when the ignition is turned "on".

4. Disconnect wire on car which is attached to "AMM" terminal on regulator, and connect one of the heavy "A. V. R." ammeter leads to this wire.

5. Connect regulator terminals "IGN" and "AMM" together, either with a short "jump" wire or with a double ended test lead.

6. Connect the other heavy lead from A. V. R. meter to terminal "AMM" on regulator.

**Fig. 5**

Changing the Operating Voltage of a Regulator by bending the Lower Spring Hanger.

7. Turn on ignition, start engine, and idle at a speed which will show "charge".
8. Cut-out "A. V. R." resistance by turning knob to "out" position.
9. Place toggle switches on both volt and ammeter to read on low scales (10 volt and 30 amp.).
10. With generator showing a charging rate of from 8 to 10 amps. the regulator voltage (if cold, 70 degrees F.), should be 7.7 to 8.0 volts, and if hot (150 degrees F.) the voltage should be 7.45 to 7.55. The "A. V. R." resistance should be used to maintain the 8 to 10 amp. charging rate, while the test is being made. If, however, the charging rate is less than 8 amperes with all the resistance cut-out of the circuit, the car battery will have to be discharged, either by cranking the engine for a short period of time, with the ignition turned "off", or by placing the car in gear, setting the brakes, and closing the starter circuit, which will result in a high rate battery discharge, due to a locked starting motor.
11. After regulator has reached the proper temperature, slow down the engine until the cut-out relay points open.
12. Increase the generator speed to between 2000 and 3000 R.P.M., and proceed with voltage check. If regulator checks within limits specified in paragraph 10 of this section the unit is correctly adjusted. If not, bend lower spring support either up or down until the above readings result.

TABULATION OF ADJUSTMENTS.

DELCO-REMY REGULATORS — MODELS 5557 AND 5588

CUT-OUT RELAY—Closes—6.5 to 7.25 volts.

Opens—0 to 3 amps. discharge at 6.3 volts.

Contact Gap—.018 to .025 inch.

Core Gap—.018 to .022 inch, contacts closed.

REGULATOR—Contact Tension—2.7 to 3.5 oz.

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Gap Between Fiber Bumper and Stop—.008 to .013 inches (armature up).

Contact Separation—.015 to .025 inches (armature all way down).

DELCO-REMY CONTROL UNITS' SPECIFICATIONS. **STEP-VOLTAGE REGULATORS, VIBRATING-POINT CURRENT AND VOLTAGE REGULATORS.**

DATA REVISED JULY 1, 1935 TO CONFORM WITH DELCO-REMY SPECIFICATIONS (1 R-185, date of 5-1-35).

		VOLTAGE CONTROL RELAY									CURRENT CONTROL RELAY				CUT-OUT RELAY						
REGULATOR NUMBER	BAT. TERMINAL GROUNDED	CONTACT SPRING TENSION (OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	ARMATURE TRAVEL (INCHES)	OPEN CIRCUIT VOLTAGE	VOLTAGE SETTING 70° F. WITH GENERATOR CHARGING FROM 8 TO 10 AMPS.	POINTS OPEN 70° F. (VOLTS)	POINTS CLOSE 70° F. (VOLTS)	CONTACT SPRING TENSION (OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	SETTING 70° F. (AMPS)	AIR GAP (INCHES)	POINT OPENING (INCHES)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS)	TYPE OF UNIT	
5524	P				.012-.015		14.75-15.0										.055-.060	.020-.025	13-14	0-3.0	Vibrating Voltage
5525	P				.012-.015		14.75-15.0							.012-.015	40		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5526	P				.012-.015		14.75-15.0							.012-.015	40		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5528					.012-.015		7.5 - 8.0										.055-.060	.020-.025	6.5 - 7.0	0-3.0	Vibrating Voltage
5529	P				.012-.015		14.75-15.0							.012-.015	18		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5530	P				.012-.015		14.75-15.0							.012-.015	50		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5531	P			.018-.020	.012-.015		14.75-15.0							.012-.015	80		.050	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5533	P				.012-.015		8.3 - 8.5										.055-.060	.020-.025	6.5 - 7.0	0-3.0	Vibrating Voltage
5534	P				.012-.015		8.3 - 8.5										.055-.060	.020-.025	6.5 - 7.0	0-3.0	Vibrating Voltage
5535	P				.012-.015		14.75-15.0										.055-.060	.020-.025	13-14	0-3.0	Vibrating Voltage
5536	P				.012-.015		14.75-15.0										.055-.060	.020-.025	13-14	0-3.0	Vibrating Voltage
5538	P				.012-.015		8.3 - 8.5										.055-.060	.020-.025	6.5 - 7.0	0-3.0	Vibrating Voltage
5539				.050-.060	.015-.020				8.5 - 8.9	7.0-7.5							.012-.017	.015-.025	6.75- 7.5	0-2.5	Two Step Voltage
5540		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5541											2.0-2.5	.006-.008	.055-.060	.015-.025	13-16		.012-.017	.015-.025	6.75- 7.25	0-3.0	Vibrating Current
5542		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5543											2.0-2.5	.006-.008	.055-.060	.015-.025	7.5-8.5		.012-.017	.015-.025	6.4 - 6.8	0-3.0	Vibrating Current
5544		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5545											2.0-2.5	.006-.008	.055-.060	.015-.025	6.5-7.5		.012-.017	.015-.025	6.4 - 6.8	0-3.0	Vibrating Current
5546		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage

A — Measure air gap with armature pressed down until fiber bumper just touches stop.

B — Generator delivers 19-22 amp. with 11 amp. lamp load.

C — Generator delivers 12-13 amp. with 7 amp. lamp load.

D — Generator delivers 10-12 amp. with 7 amp. lamp load.

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DELCO-REMY CONTROL UNITS' SPECIFICATIONS.—(Continued)

		VOLTAGE CONTROL RELAY								CURRENT CONTROL RELAY					CUT-OUT RELAY						
REGULATOR NUMBER	BAT. TERMINAL GROUNDED	CONTACT SPRING TENSION (OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	ARMATURE TRAVEL (INCHES)	OPEN CIRCUIT VOLTAGE	VOLTAGE SETTING 70° F. WITH GENERATOR CHARGING FROM 8 TO 10 AMPS.	POINTS OPEN 70° F. (VOLTS)	POINTS CLOSE 70° F. (VOLTS)	CONTACT SPRING TENSION (OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	SETTING 70° F. (AMPS)	AIR GAP (INCHES)	POINT OPENING (INCHES)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS)	TYPE OF UNIT	
5548		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5549		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5550		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5551		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5552		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5554		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5555		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5556		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5557	N	2.7-3.5	.008-.013	.060-.070	.015-.025		Set on closed cir- cuit only	7.7-8.0									.018-.022	.018-.025	6.5 - 7.25	0-3.0	Vibrating Voltage
5558		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5559	P	2.7-3.5	.008-.013	.060-.070	.015-.025		Set on closed cir- cuit only	7.7-8.0			2.7-3.5	.008-.013	.070-.080	.015-.025	20-22		.018-.022	.018-.025	6.75- 7.5	0-3.0	Vibrating Volt & Cur.
5560		.7- .9		.028-.040	.008-.013	.028-.040			15.5 -16.25	14-15							.012-.017	.015-.025	13.2 -14.0	0-3.5	Two Step Voltage
5561					.012-.015		29.5 -30.0							.012-.015	14		.055-.060	.020-.025	26-27	0-3.0	Vibrating Volt & Cur.
5562					.012-.015		29.5 -30.0							.012-.015	10		.055-.060	.020-.025	26-27	0-3.0	Vibrating Volt & Cur.
5563	P				.012-.015		14.75-15.0										.055-.060	.020-.025	13-14	0-3.0	Vibrating Voltage
5564					.012-.015		14.75-15.0							.012-.015	50		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5565					.012-.015		29.5 -30.0							.012-.015	25		.055-.060	.020-.025	26-27	0-3.0	Vibrating Volt & Cur.
5566	P				.012-.015		14.75-15.0							.012-.015	50		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5567	P				.012-.015		8.3 - 8.5							.012-.015	40		.055-.060	.020-.025	6.5 - 7.0	0-3.0	Vibrating Volt & Cur.
5568	P			.018-.020	.012-.015		14.75-15.0							.012-.015	100		.050	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.

A — Measure air gap with armature pressed down until fiber bumper just touches stop.

B — Generator delivers 19-22 amp. with 11 amp. lamp load.

C — Generator delivers 12-13 amp. with 7 amp. lamp load.

D — Generator delivers 10-12 amp. with 7 amp. lamp load.

DELCO-REMY CONTROL UNITS' SPECIFICATIONS.—(Continued)

		VOLTAGE CONTROL RELAY									CURRENT CONTROL RELAY					CUT-OUT RELAY					
REGULATOR NUMBER	BAT. TERMINAL GROUNDED	CONTACT SPRING TENSION (OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	ARMATURE TRAVEL (INCHES)	OPEN CIRCUIT VOLTAGE	VOLTAGE SETTING 70° F. WITH GENERATOR CHARGING FROM 8 TO 10 AMPS	POINTS OPEN 70° F. (VOLTS)	POINTS CLOSE 70° F (VOLTS)	CONTACT SPRING TENSION (OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	SETTING 70° F. (AMPS)	AIR GAP (INCHES)	POINT OPENING (INCHES)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS)	TYPE OF UNIT	
5569	P				.012-.015		14.75-15.0							.012-.015	30	.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.	
5570	P				.012-.015		8.3 - 8.5									.055-.060	.020-.025	6.5 - 7.0	0-3.0	Vibrating Voltage	
5581		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5582		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5583		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5584		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5585		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5586		.7- .9		.028-.040 A	.008-.013	.028-.040			15.5 -16.25	14-15							.012-.017	.015-.025	13.2 -14.0	0-3.5	Two Step Voltage
5587	N	2.7-3.5	.008-.013	.060-.070 A	.015-.025		Set on closed cir- cuit only	7.3-7.6			2.7-3.5	.008-.013	.070-.080	.015-.025	20-22		.018-.022	.018-.025	6.75- 7.5	0-3.0	Vibrating Volt & Cur.
5588	N	2.7-3.5	.008-.013	.060-.070 A	.015-.025		Set on closed cir- cuit only	7.7-8.0									.018-.022	.018-.025	6.5 - 7.25	0-3.0	Vibrating Voltage
5589		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5590		.7- .9		.028-.040 A	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5591	P	2.7-3.5	.008-.013	.060-.070 A	.015-.025		Set on closed cir- cuit only	7.7-8.0									.018-.022	.018-.025	6.5 - 7.25	0-3.0	Vibrating Voltage
5592	N	2.7-3.5	.008-.013	.060-.070 A	.015-.025		Set on closed cir- cuit only	7.7-8.0									.018-.022	.018-.025	6.5 - 7.25	0-3.0	Vibrating Voltage
5593		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5594		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5595		.7- .9		.028-.040 A	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5596	P	2.7-3.5	.008-.013	.060-.070 A	.015-.025		Set on closed cir- cuit only	7.3-7.6			2.7-3.5	.008-.013	.070-.080	.015-.025	20-22		.018-.022	.018-.025	6.75- 7.5	0-3.0	Vibrating Volt & Cur.
5597	P	2.7-3.5	.008-.013	.050-.060 A	.015-.025		Set on closed cir- cuit only	7.3-7.6			2.7-3.5	.008-.013	.070-.080	.015-.025	24-26		.018-.022	.018-.025	6.75- 7.5	0-3.0	Vibrating Volt & Cur.
5599	N	2.7-3.5	.008-.013	.050-.060 A	.015-.025		Set on closed cir- cuit only	7.3-7.6			2.7-3.5	.008-.013	.070-.080	.015-.025	24-26		.018-.022	.018-.025	6.75- 7.5	0-3.0	Vibrating Volt & Cur.

A — Measure air gap with armature pressed down until fiber bumper just touches stop.
 B — Generator delivers 19-22 amp. with 11 amp. lamp load.

C — Generator delivers 12-13 amp. with 7 amp. lamp load.
 D — Generator delivers 10-12 amp. with 7 amp. lamp load.

1935 Valve and Ignition Timing Specifications

Compiled by Weidenhoff Engineers for use with
Weidenhoff Motor Gauge

1935 Passenger Cars	Adapter	Rod	Stroke	Ignition Timing	Before or After T.D.C.	Spark Retard, Advance or Set	Intake Valve Opens	Before or After T.D.C.	Firing Order	Valve Clearances				Breaker Contact Separation	Spark Plug Gap (Ins.)
										Timing		Running			
										Int.	Exh.	Int.	Exh.		
AUBURN (658).....	114	42	4 3/4	.004	B.T.C.	Ret.	.011	B.T.C.	1-5-3-6-2-4	.010	.010	.006	.006	.018	.025
" (851).....	105	5	4 3/4	.004	B.T.C.	Ret.	.011	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.006	.006	.013	.025
BUICK 40.....	113	31	3 3/4	.001	B.T.C.	Adv.	.008	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.008	.008	.013	.020
" 50.....	113	38	4 1/4	.020	B.T.C.	Adv.	.008	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.008	.008	.013	.020
" 60.....	113	31	4 3/4	.053	B.T.C.	Adv.	.009	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.008	.008	.013	.020
" 90.....	113	31	5	.047	B.T.C.	Adv.	.010	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.008	.008	.013	.020
CADILLAC (355-D).....	104	42	4-15/16	.009	B.T.C.	Adv.	.017	B.T.C.	1-2-7-8-4-5-6-3	.006	.004	.006	.010	.013	.025
" (370-D).....	113	33	4	.006	B.T.C.	Adv.	T.D.C.	.....	1-4-9-8-5-2-11-10-3-6-7-12	A	A	A	A	.018	.025
" (452-D).....	113	33	4	.006	B.T.C.	Adv.	T.D.C.	.....	{ 1-8-9-14-3-6-11-2-15- 10-7-4-13-12-5-16	A	A	A	A	.014	.025
CHEVROLET Master.....	113*	33	4	.012	B.T.C.	Adv.	.006	B.T.C.	1-5-3-6-2-4	.006	.013	.006	.013	.021	.032
" Standard ..	113*	33	4	.009	B.T.C.	Adv.	.006	B.T.C.	1-5-3-6-2-4	.006	.013	.006	.013	.021	.032
CHRYSLER (C-6) AS.....	114-103	42-12	4 1/2	T.D.C.	.....	Set	T.D.C.	.....	1-5-3-6-2-4	.010	.010	.006	.008	.020	.025
" (CZ-6) AS...	114-103	42-12	4 1/2	T.D.C.	.....	Set	T.D.C.	.....	1-6-2-5-8-3-7-4	.011	.012	.006	.008	.018	.025
" (C1-8) AF.....	114-103	42-12	4 3/4	T.D.C.	.....	Set	T.D.C.	.....	1-6-2-5-8-3-7-4	.011	.012	.006	.008	.018	.025
" (C2-8) AF...	114-103	42-12	4 3/4	.012	A.T.C.	Set	.011	A.T.C.	1-6-2-5-8-3-7-4	.011	.012	.006	.008	.018	.025
" (C3-8) AF...	114-103	42-12	5	.012	A.T.C.	Set	.012	A.T.C.	1-6-2-5-8-3-7-4	.008	.008	.009	.009	.018	.025
DE SOTO (SF-6).....	114	12	4 1/2	.004	A.T.C.	Ret.	T.D.C.	.....	1-5-3-6-2-4	.010	.010	.006	.008	.020	.025
" (SG-6).....	114	12	4 1/2	.004	A.T.C.	Ret	T.D.C.	.....	1-5-3-6-2-4	.010	.010	.006	.008	.020	.025
DODGE (DU-6).....	114-103	42-12	4 3/4	.005	A.T.C.	Ret.	.015	A.T.C.	1-5-3-6-2-4	.011	.012	.006	.008	.020	.025
DUESENBERG (8-A).....	104	8	4 3/4	.049	B.T.C.	Adv.	.015	B.T.C.	1-6-2-5-8-3-7-4	.025	.025	.025	.025	.024	.025
FORD V-8.....	104	40	3 3/4	.006	B.T.C.	Set	.032	B.T.C.	1-5-4-8-6-3-7-2	.013	.013	.013	.013	.015	.025
GRAHAM (G-74).....	102	2	4	.006	B.T.C.	Adv.	.001	B.T.C.	1-5-3-6-2-4	.012	.012	.010	.010	.018	.025
" Special (8-73)...	102	2	4 1/2	.004	B.T.C.	Adv.	T.D.C.	.....	1-5-3-6-2-4	.012	.012	.010	.010	.018	.025
" (8-72).....	102	40	4	.003	B.T.C.	Adv.	T.D.C.	.....	1-6-2-5-8-3-7-4	.012	.012	.010	.010	.018	.025
" Super (8-75)....	104	40	4	.003	B.T.C.	Adv.	T.D.C.	.....	1-6-2-5-8-3-7-4	.012	.012	.010	.010	.018	.025
HUDSON 6.....	114	44	5	T.D.C.*	.....	Adv.	.040	B.T.C.	1-5-3-6-2-4	.010	.010	.006	.008	.020	.022
" 8.....	114	44	4 1/2	T.D.C.*	.....	Set	.052	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.006	.008	.018	.022
HUPMOBILE (518-D)...	104	2	4 1/4	.020*	B.T.C.	Adv.	.002	B.T.C.	1-5-3-6-2-4	....	....	.010	.013	.018	.028
" (521-O).....	104	2	4 3/4	.022*	B.T.C.	Adv.	.004	A.T.C.	1-4-7-3-8-5-2-6	....	....	.018	.018	.021	.028
" (527-T).....	104	2	4 3/4	.022*	B.T.C.	Adv.	.004	A.T.C.	1-4-7-3-8-5-2-6	....	....	.018	.018	.021	.028
LAFAYETTE (6-3510)...	104	40	4 3/4	.041	B.T.C.	Adv.	.....	.....	1-5-3-6-2-4	.015	.015	.008	.008	.020	.025
LA SALLE.....	104	40	4 3/4	.026	B.T.C.	Adv.	.015	A.T.C.	1-6-2-5-8-3-7-4	.015	.015	.006	.008	.018	.025
LINCOLN V-12.....	104	40	4 1/2	.021	B.T.C.	Adv.	.186	B.T.C.	1-4-9-8-5-2-11-10-3-6-7-12	.003	.005	.003	.005	.020	.025
NASH (3520).....	113*	37	4 3/4	.093	B.T.C.	Adv.	.....	.....	1-5-3-6-2-4	.015	.015	.015	.015	.020	.025
" (3540 and 3640)...	104	40	4 3/4	.041	B.T.C.	Adv.	.....	.....	1-5-3-6-2-4	.015	.015	.008	.008	.020	.025
" (3580).....	113*	37	4 1/4	.090	B.T.C.	Adv.	.....	.....	1-6-2-5-8-3-7-4	.015	.015	.015	.015	.020	.025
" (3590).....	113	31	4 1/2	.096	B.T.C.	Adv.	.....	.....	1-6-2-5-8-3-7-4	.015	.015	.015	.015	.020	.022
OLDSMOBILE 6.....	104	40	4 1/4	.001	B.T.C.	Adv.	.010	B.T.C.	1-5-3-6-2-4	.010	.010	.008	.010	.018	.025
" 8.....	104	2	4 3/4	.004	B.T.C.	Adv.	T.D.C.	.....	1-6-2-5-8-3-7-4	.010	.010	.008	.010	.018	.025
PACKARD 120.....	114	5	3 3/4	.009	B.T.C.	Adv.	.009	B.T.C.	1-6-2-5-8-3-7-4	....	....	.007	.009	.018	.025
" 8.....	114	5	5	.017	B.T.C.	Adv.	.412	B.T.C.	1-6-2-5-8-3-7-4	....	....	.004	.006	.018	.025
" Super 8.....	114	5	5	.017	B.T.C.	Adv.	.412	B.T.C.	1-6-2-5-8-3-7-4	....	....	.004	.006	.018	.025
" 12.....	114	2	4 1/4	.026	B.T.C.	Adv.	T.D.C.	.....	{ 1R-6L-5R-2L-3R-4L- 6R-1L-2R-5L-4R-3L	....	....	A	A	.018	.025
PIERCE-ARROW 845....	114	29	5	.030	B.T.C.	Adv.	.012	A.T.C.	1-6-2-5-8-3-7-4	.004	.006	A	A	.018	.022
" 1245.....	114	42	4	.024	B.T.C.	Adv.	.030	B.T.C.	1-4-9-8-5-2-11-10-3-6-7-12	.004	.006	A	A	.018	.022
" 1255.....	114	42	4	.024	B.T.C.	Adv.	.030	B.T.C.	1-4-9-8-5-2-11-10-3-6-7-12	.004	.006	A	A	.018	.022
PLYMOUTH 6.....	114-103	42-12	4 3/4	.004	B.T.C.	Adv.	.015	A.T.C.	1-5-3-6-2-4	.011	.012	.006	.008	.020	.025
PONTIAC Six.....	114	42	3 3/4	.030	B.T.C.	Adv.	.009	B.T.C.	1-5-3-6-2-4	.010	.010	.009	.009	.018	.025
" Eight.....	114	42	3 1/2	.027	B.T.C.	Adv.	T.D.C.	.....	1-6-2-5-8-3-7-4	.010	.010	.009	.009	.018	.025
REO 6-A.....	104	2	4 1/4	.012	B.T.C.	Set	T.D.C.	.....	1-5-3-6-2-4	.012	.012	.007	.008	.020	.025
" 8.....	104	2	5	.014	B.T.C.	Set	T.D.C.	.....	1-5-3-6-2-4	.012	.012	.007	.008	.020	.025
STUDEBAKER Dict. 6...	104	2	4 1/4	T.D.C.	.....	Adv.	.088	B.T.C.	1-5-3-6-2-4	.010	.010	.004	.006	.020	.023
" Comm. 8.....	104	2	4 1/4	T.D.C.	.....	Set	.090	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.004	.006	.020	.023
" Pres. 8.....	104	2	4 1/4	T.D.C.	.....	Set	.090	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.004	.006	.020	.023
STUTZ SV-16.....	113	31	4 1/2	.086	B.T.C.	Adv.	.001	B.T.C.	1-6-2-5-8-3-7-4	.028	.028	.028	.028	.017	.025
" DV-32.....	104	8	4 1/2	.152	B.T.C.	Adv.	.009	B.T.C.	1-6-2-5-8-3-7-4	.046	.046	.046	.046	.020	.022
TERRAPLANE 6.....	114	43	5	T.D.C.	.....	Set	.057	B.T.C.	1-5-3-6-2-4	.010	.010	.006	.008	.018	.022
WILLYS 77.....	104	2	4 3/4	.007	B.T.C.	Set	T.D.C.	.....	1-3-4-2	.010	.010	.004	.006	.018	.024

EXPLANATION OF ABBREVIATIONS

Adv.—Advanced Spark
A.—Automatic Take-up

B.T.C.—Before Top Center
A.T.C.—After Top Center

H—Hot
C—Cold

T.D.C.—Top Dead Center
Ret.—Retarded Spark

*Chevrolet Master & Standard—Use No. 113 Adapter with No. 152 Adapter.

*Hudson and Hupmobile cars must be timed from rear cylinder.

*Nash—3520 and 3580 use No. 113 Adapter with No. 152 Adapter plus No. X4615 Collar.

Note—On Cars using 14 mm. spark plugs, first insert rod through spark plug hole and slip adapter over rod.

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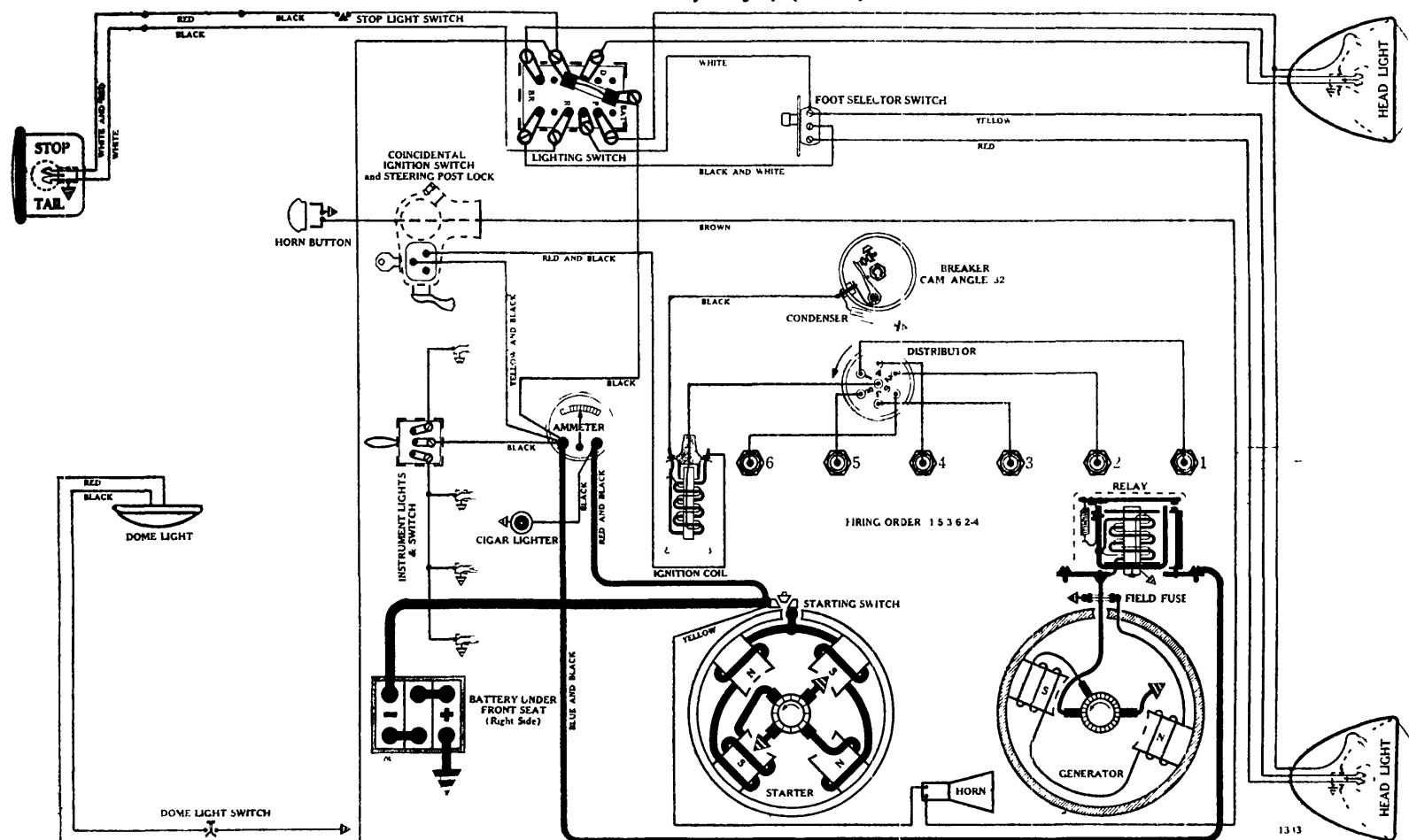
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AUBURN							
1333		1935	6-53 6 cyl.	653-1000 and up	Auto-Lite MAJ-4032	Auto-Lite GAR-4603-3	Auto-Lite IGB-4318
1334		1935	6-53 With Startix	653-1000 and up	Auto-Lite MAJ-4033-3	Auto-Lite GAR-4603-3	Auto-Lite IGB-4318
1335		1935	8-51 Straight Eight	851-1000 and up	Auto-Lite MAB-4063	Auto-Lite GAR-4603-3	Auto-Lite IGP-4002
1336		1935	8-51 "Super-Charged" Straight Eight	851-3100 and up	Auto-Lite MAB-4063	Auto-Lite GAR-4603-A-3	Auto-Lite IGH-4027
AUSTIN							
1337		1935	4 cyl.	475-7900 and up	Auto-Lite MAK-4001	Auto-Lite GAS-4104-B	Auto-Lite IGB-4086-A
BUICK							
1338		1935	Series 35-40 Straight Eight	2777650 and up	Delco-Remy 734-Z	Delco-Remy 936-C	Delco-Remy 663-E
1339		1935	Series 35-50 Straight Eight	2777677 and up	Delco-Remy 727-G	Delco-Remy 956-H	Delco-Remy 663-C
1340		1935	Series 35-60 Straight Eight	2777802 and up	Delco-Remy 727-F	Delco-Remy 956-H	Delco-Remy 663-A
1341		1935	Series 35-90 Straight Eight	2777806 and up	Delco-Remy 727-F	Delco-Remy 956-H	Delco-Remy 663-A
CADILLAC							
1342		1935	355-D "Vee" 8	3105001 and up	Delco-Remy 728-U	Delco-Remy 933-B	Delco-Remy 661-V
1343		1935	370-D "Vee" 12	4100701 and up	Delco-Remy 580	Delco-Remy 933-C	Delco-Remy 667-C
1344		1935	452-D "Vee" 16	5100101 and up	Delco-Remy 580	Delco-Remy 933-C	Delco-Remy 4118
CHEVROLET							
1345		1935	"Master" Series EA, 6 cyl.	EA-1001 and up	Delco-Remy 738-G	Delco-Remy 935-V	Delco-Remy 645-G
1346		1935	"Standard" Series EC, 6 cyl.	EC-1001 and up	Delco-Remy 738-G	Delco-Remy 943-J	Delco-Remy 645-G
CHRYSLER							
1347		1935	C-6, "Airstream" 6 cyl.	6800001 (Detroit) 9703366 (Canada)	Auto-Lite MAX-4002	Auto-Lite GAR-4608-5	Auto-Lite IGS-4001
1348		1935	CZ, "Airstream" Straight Eight	6701501 (Detroit) 9755421 (Canada)	Auto-Lite MAX-4002, 4004	Auto-Lite GAR-4608-A-5	Auto-Lite IGT-4001
1349		1935	C-1, "Airflow" Straight Eight	6601201 (Detroit) 9821126 (Canada)	Auto-Lite MAX-4003	Auto-Lite GAR-4608-B-5	Auto-Lite IGT-4001-B
1350		1935	C2&C3 "Airflow" Straight Eights	C2-7012675 (Detroit) C3-7528551 (Detroit)	Delco-Remy 727-J	Delco-Remy 935-G	Delco-Remy 665-B
DE SOTO							
1351		1935	SF, "Airstream" 6 cyl.	6023501 (Detroit) 9664001 (Canada)	Auto-Lite MAX-4002	Auto-Lite GAR-4608-5	Auto-Lite IGS-4001
1352		1935	SG, "Airflow" 6 cyl.	5082201 (Detroit) 9603436 (Canada)	Auto-Lite MAX-4003	Auto-Lite GAR-4608-5	Auto-Lite IGS-4001
DODGE							
1353		1935	DU and DV 6 cyl.	DU-3756501 (Detroit) DV-9316226 (Detroit)	Auto-Lite MAW-4002, 4003	Auto-Lite GAR-4608-5	Auto-Lite IGS-4002, 4003
FORD							
1354		1935	48 "Vee" 8	18-1234357 and up	Ford 18-11002	Ford 40-10000-B	Ford 40-12127-B
GRAHAM							
1355		1935	74, 6 cyl. Special Six	1700001 and up	Delco-Remy 738-J	Delco-Remy 937-Y	Delco-Remy 622-Z
1356		1935	73, 6 cyl. Standard Six	1635001 and up	Delco-Remy 738-D	Delco-Remy 936-D	Delco-Remy 632-Z
1357		1935	72, Standard Straight Eight	1810001 and up	Delco-Remy 734-U	Delco-Remy 936-F	Delco-Remy 661-X
1358		1935	75, "Super-Charged" Straight Eight	1035001 and up	Delco-Remy 734-U	Delco-Remy 936-G	Delco-Remy 661-Y
HUDSON							
1359		1935	35-GH Big Six	53101 and up	Auto-Lite MAB-4060	Auto-Lite GBK-4602-1	Auto-Lite IGB-4301-A, 4301-B
1360		1935	35-HT, 35-HU, 35-HHU, Straight Eights	54101 and up	Auto-Lite MAB-4061	Auto-Lite GBK-4602-1	Auto-Lite IGP-4001-A, 4001-B
HUPMOBILE							
1361		1935	D, Series 518 6 cyl.	D-5001 and up	Auto-Lite MAJ-4039	Auto-Lite GBK-4604	Auto-Lite IGB-4319, IGC-4058
See 1934 diagram		1935	J, Series 521 6 cyl.	J-14001 and up	Auto-Lite MAB-4065	Auto-Lite GBK-4063	Auto-Lite IGC-4058
1362		1935	O, Series 521 Straight Eight	O-6001 and up	Auto-Lite MAB-4066	Auto-Lite GAR-4620-5	Auto-Lite IGP-4003
See 1934 diagram		1935	T, Series 527 8 cyl.	T-6001 and up	Auto-Lite MAB-4066	Auto-Lite GAR-4606	Auto-Lite IGP-4003

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1363	LAFAYETTE	1935	3510 6 cyl.	L-13701 and up	Auto-Lite MAB-4068	Auto-Lite GAR-4205-2	Auto-Lite IGB-4317, 4317-A
1364	LA SALLE	1935	35-50 Straight Eight	2106170 and up	Delco-Remy 727-N	Delco-Remy 961-D	Delco-Remy 662-R
1365	LINCOLN	1935	67 Degree "Vee" 12	K-3501 and up	Auto-Lite MAO-4003-B	Auto-Lite GBC-4103	Auto-Lite IGM-4003, 4003-A
1366	NASH	1935	3520, Twin Ign. Advanced Six	R-294725 and up	Auto-Lite MAB-4053	Auto-Lite GAR-4601-3	Auto-Lite IGE-4012
1367		1935	3540 or 3640 Single Ign. Six		Auto-Lite MAB-4068	Auto-Lite GAR-4618-2	Auto-Lite IGB-4328
1368		1935	3580, Advanced and Ambassador Straight Eights	B-75010 and up	Auto-Lite MAB-4054	Auto-Lite GAR-4601-3	Auto-Lite IGK-4101
1369	OLDSMOBILE	1935	F-35 6 cyl.	103001 and up	Delco-Remy 734-K	Delco-Remy 935-X	Delco-Remy 622-Y
1370		1935	L-35 Straight Eight	44001 and up	Delco-Remy 725-Y	Delco-Remy 935-X	Delco-Remy 662-R
1371	PACKARD	1935	One Twenty Straight Eight	X-1501 and up	Auto-Lite MAX-4006	Auto-Lite GAR-4611-5	Auto-Lite IGH-4026, 4026-A
1372		1935	Twelve Hundred Series Straight Eights	803-1 and up	Owen-Dyneto DN-1270	Owen-Dyneto CO-1240	Delco-Remy 662-W
1373		1935	1206, 1207, 1208 "Vee" Twelves	903001 and up	Owen-Dyneto DN-1273	Owen-Dyneto CO-1271	Auto-Lite IGO-4002-A
1374	PIERCE-ARROW	1935	845 Straight Eight	2090001 and up	Owen-Dyneto DI-1237	Owen-Dyneto CO-1236	Delco-Remy 662-J
1375		1935	1245 and 1255 "Vee" 12	3540001 and up 3570001 and up	Owen-Dyneto DY-1242	Owen-Dyneto CO-1236	Delco-Remy 4105
1376	PLYMOUTH	1935	PJ Plymouth Six	1039101 and up (Detroit)	Auto-Lite MAW-4002	Auto-Lite GBM-4603-1	Auto-Lite IGS-4003
1377		1935	PJ, 6 cyl. Plymouth DeLuxe	2397601 and up (Detroit)	Auto-Lite MAW-4002	Auto-Lite GAR-4608-5	Auto-Lite IGS-4003
1378	PONTIAC	1935	701-A and 701-B 6 cyl.	6AA-1001 and up 6AB-1001 and up	Delco-Remy 727-T	Delco-Remy 935-W	Delco-Remy 647-A
1379		1935	605 Straight Eight	8AA-1001 and up	Delco-Remy 727-S	Delco-Remy 935-W	Delco-Remy 663-B
1380	REO	1935	7S-35 6 cyl.	7S-100 and up	Delco-Remy 736-G	Delco-Remy 955-R	Delco-Remy 644-M
1381		1935	6A-35 6 cyl.	6A-100 and up	Delco-Remy 738-K	Delco-Remy 937-Z	Delco-Remy 645-K
1382	STUDEBAKER	1935	1-A, 6 cyl. Dictator Standard	5960501 and up	Auto-Lite MAN-4005	Auto-Lite GBM-4604-2	Auto-Lite IGB-4393
1383		1935	2-A, 6 cyl. Dictator DeLuxe	5955001 and up	Auto-Lite MAN-4002	Auto-Lite GAR-4609-5	Auto-Lite IGB-4393
1384		1935	1-B, Commander Straight Eight	8951201 and up	Delco-Remy 736-H	Delco-Remy 935-Y	Delco-Remy 662-M
1385		1935	President Straight Eight	7951201 and up	Delco-Remy 736-H	Delco-Remy 935-Y	Delco-Remy 662-M
1386	TERRAPLANE	1935	35-G, Special 6 cyl.	51101 and up	Auto-Lite MAB-4060	Auto-Lite GBK-4601-2	Auto-Lite IGB-4301-A
1387		1935	35-GU, DeLuxe 6 cyl.	52101 and up	Auto-Lite MAB-4060	Auto-Lite GBK-4602-1	Auto-Lite IGB-4301-A, 4301-B
1388	WILLYS	1935	77-B 4 cyl.	27001 and up	Auto-Lite MZ-4033	Auto-Lite GAM-4504	Auto-Lite IGB-4078

AUBURN

Mod 1 6-53, 6 cyl., (1935)



BATTERY

U.S.L., RN-15-A, 6 volts. Positive Terminal Grounded

Starting Capacity—115 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—2.9.

Lighting Capacity—4.5 amps. for 20 hours (90 amp. hour).

Box—Length, 9; width, 7; height, 8½ inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite, MAJ-4032

Connection to Engine—Bendix Drive, Type R11FX-10.

Running Free—67 amps. at 5½ volts, 4100 R.P.M.

Cranking Engine—225 to 250 amps. at 5 volts.

Lock Torque—12 pound-feet, 550 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-3737-S (on starter).

Armature—Auto-Lite, MAJ-2006.

IGNITION

A-L Test No. 396 Rotation, L. H., Top View

Auto-Lite, IGB-4318

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 32 degrees; open 28 degrees.

Contact Spring Tension—17 to 19 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke.

Stop when flywheel mark (located 3 degrees or approximately one tooth ahead of mark "UDC 1 6") registers with indicator line at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (Champion type J-6); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
1320	660	3
1800	900	5
2280	1140	7
3000 (Max.)	1500	10

Ignition Coil—Auto-Lite, IG-4065.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 800999.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4603-3 (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.2	10	1150	7.1
2	850	6.3	14	1400	7.6
4	900	6.5	16	1600	7.8
6	950	6.7	18	1800 (Max.)	8.
8	1050	7.			

Motoring Freely—5.2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5½ volts.

Field Test—4.1 amps. at 6 volts across field coils in series.

Field Fuse—7½ amps. (Type 1A-7½).

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2077.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

Closes—6½ to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Sorensg-Manegold, No. B-5640-A.

Location—Behind instrument board, operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.

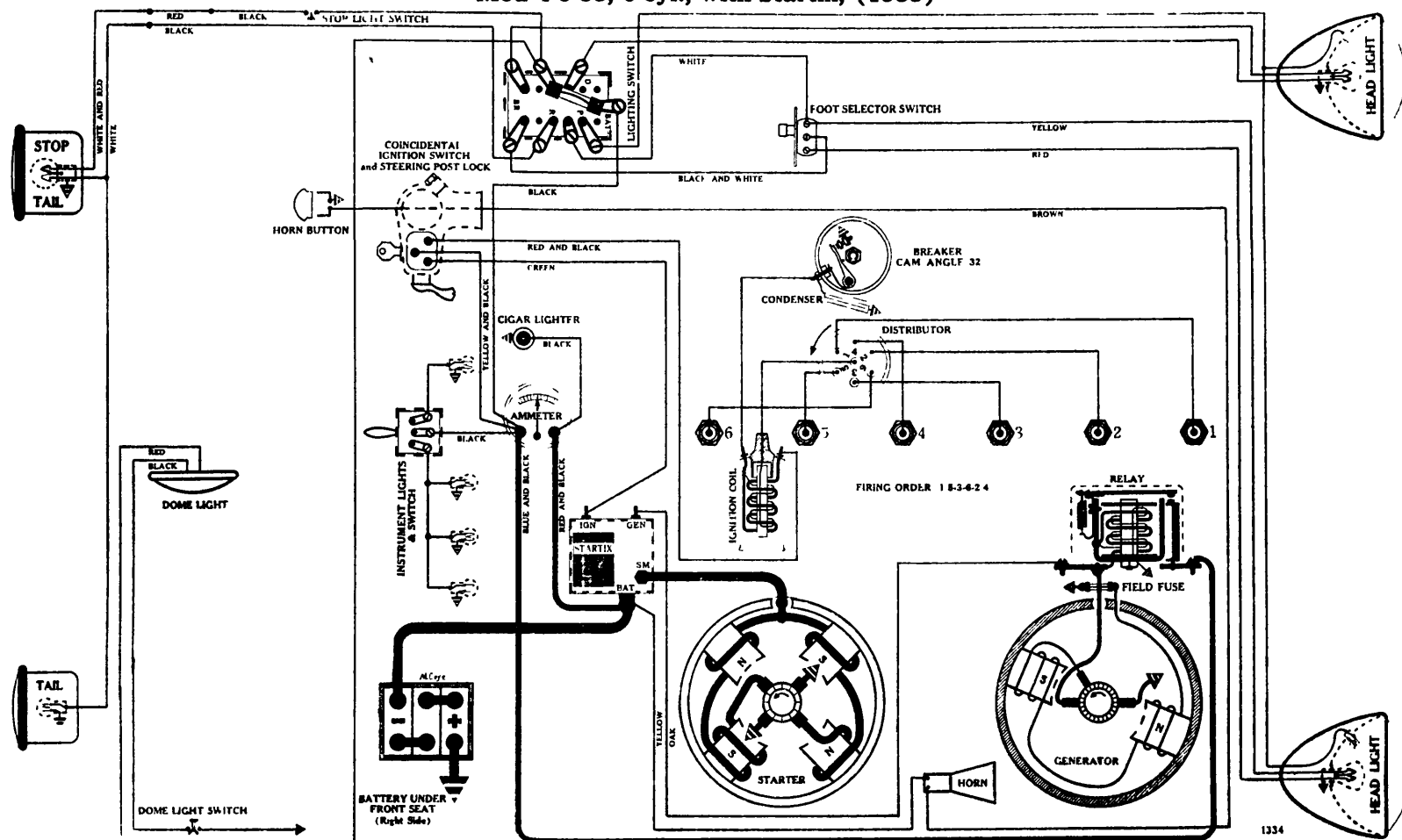
Spare fuse in clip on switch support.

Foot Selector Switch—Delco-Remy, 465-W.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

AUBURN

Mod 1 6-53, 6 cyl., with Startix, (1935)



BATTERY

U.S.L., RN-15-A, 6 volts. Positive Terminal Grounded

Starting Capacity—115 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—2.9.

Lighting Capacity—4.5 amps. for 20 hours (90 amp. hour).

Box—Length, 9; width, 7; height, 8 3/4 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite, MAJ-4033-3

Connection to Engine—Bendix Drive, Type R11FX-10.

Running Free—67 amps. at 5 1/2 volts, 4100 R.P.M.

Cranking Engine—225 to 250 amps. at 5 volts.

Lock Torque—12 pound-feet, 550 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (new brushes).

Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.

Armature—Auto-Lite, MAJ-2006.

IGNITION

A-L Test No. 396 Rotation, L. H., Top View

Auto-Lite, IGB-4318

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 32 degrees; open 28 degrees.

Contact Spring Tension—17 to 19 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark (located 3 degrees or approximately one tooth ahead of mark "UDC 1-6") registers with indicator line at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (Champion type J-6); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance	Start
600	300		3
1320	660		5
1800	900		7
2280	1140		10
3000 (Max.)	1500		

Ignition Coil—Auto-Lite, IG-4065.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301000.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4603-3 (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.2	10	1150	7.1
2	850	6.3	14	1400	7.6
4	900	6.5	16	1600	7.8
6	950	6.7	18	1800 (Max.)	8.
8	1050	7.			

Motoring Freely—5.2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5 1/2 volts.

Field Test—4.1 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps. (Type 1A-7 1/2).

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2077.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

Closes—6 3/4 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. B-5640-A.

Location—Behind instrument board, operated by pull knob.

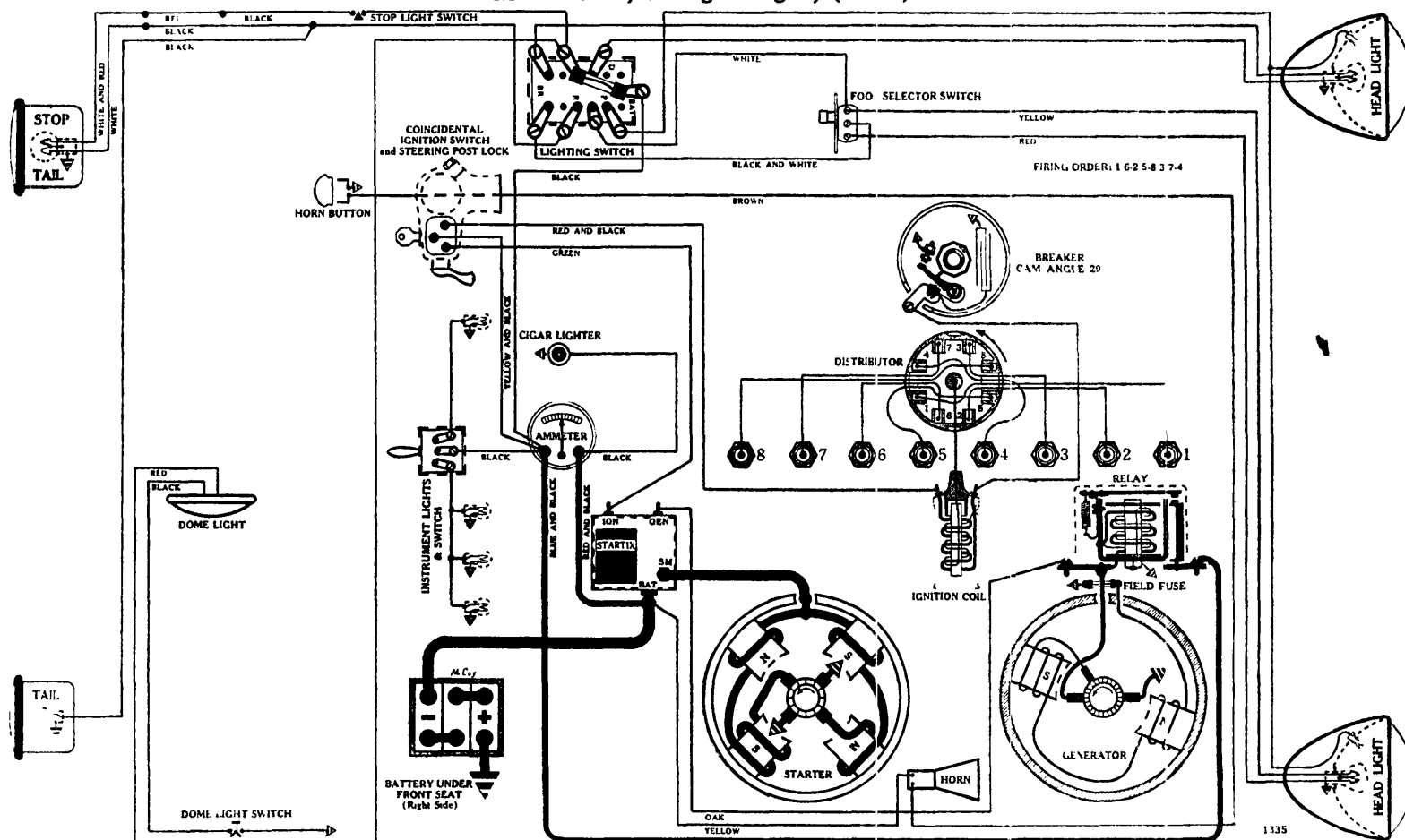
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.

Spare fuse in clip on switch support.

Foot Selector Switch—Delco-Remy, 465-W.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD--2320; PARK--63; INSTRUMENT--63; DOME--81; STOP AND TAIL--1158 (left fender); TAIL--63 (right fender).

Mod 1 8-51, Straight Eight, (1935)



U.S.L., XY-15-A, 6 volts. Positive Terminal Grounded
Starting Capacity—122 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.3.
Lighting Capacity—5.2 amps. for 20 hours (105 amp. hour).
Box—Length, 10½; width, 7; height, 8½ inches.

Rotation, L. H., Com. End
Auto-Lite, MAB-4063

Connection to Engine—Bendix Drive, Type R11FX-10.
Running Free—60 amps. at 5½ volts, 3700 R.P.M.
Cranking Engine—275 to 300 amps. at 4.5 volts.
Lock Torque—15½ pound-feet, 582 amps. at 3 volts.
Brush Spring Tension—44 to 56 oz. on each (new brushes).
Starting Switch—"Startix", type D, Automatic Starting Switch and
Anti-Stall Device.
Armature—Auto-Lite, MAB-2006.

**A-L Test No. 396 Rotation, L. H., Top View
Auto-Lite, IGP-4002
(Full Automatic Spark Advance)**

Breaker—Contact separation .015 to .017 inch.
Cam Angles—Points closed 29 degrees; open 16 degrees.
Contact Spring Tension—17 to 21 oz.
Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark (located 3 degrees or approximately one tooth ahead of mark "UDC 1-8") registers with indicator line at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—14-MM (Champion type J-6); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degree, Advance (Dist.)
600	300	Start
1320	660	3
1800	900	5
2280	1140	7
3000 (Max.)	1500	10

Ignition Coil—Auto-Lite, CE-4001-G.
Ignition Switch—Oakes Steering Post and Ignition Lock No. 3010G.

Rotation, L. H., Com. End
Auto-Lite, GAR-4603-3 (Belt Drive, Air Cooled)

Performance Data—Gen. co d.					
Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.2	10	1150	7.1
2	850	6.3	14	1400	7.6
4	900	6.5	16	1600	7.8
6	950	6.7	18	1800 (Max.)	8.
8	1050	7.			

Motoring Freely—5.2 amps. at 6 volts. .
Max. Stall Current—24 to 26 amps. at $5\frac{1}{2}$ volts.
Field Test—4.1 amps. at 6 volts across field coils in series.
Field Fuse—7½ amps. (Type 1A-7½).
Brush Spring Tension—36 oz. Max. on each (new brushes).
Armature—Auto-Lite, GAR-2077.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

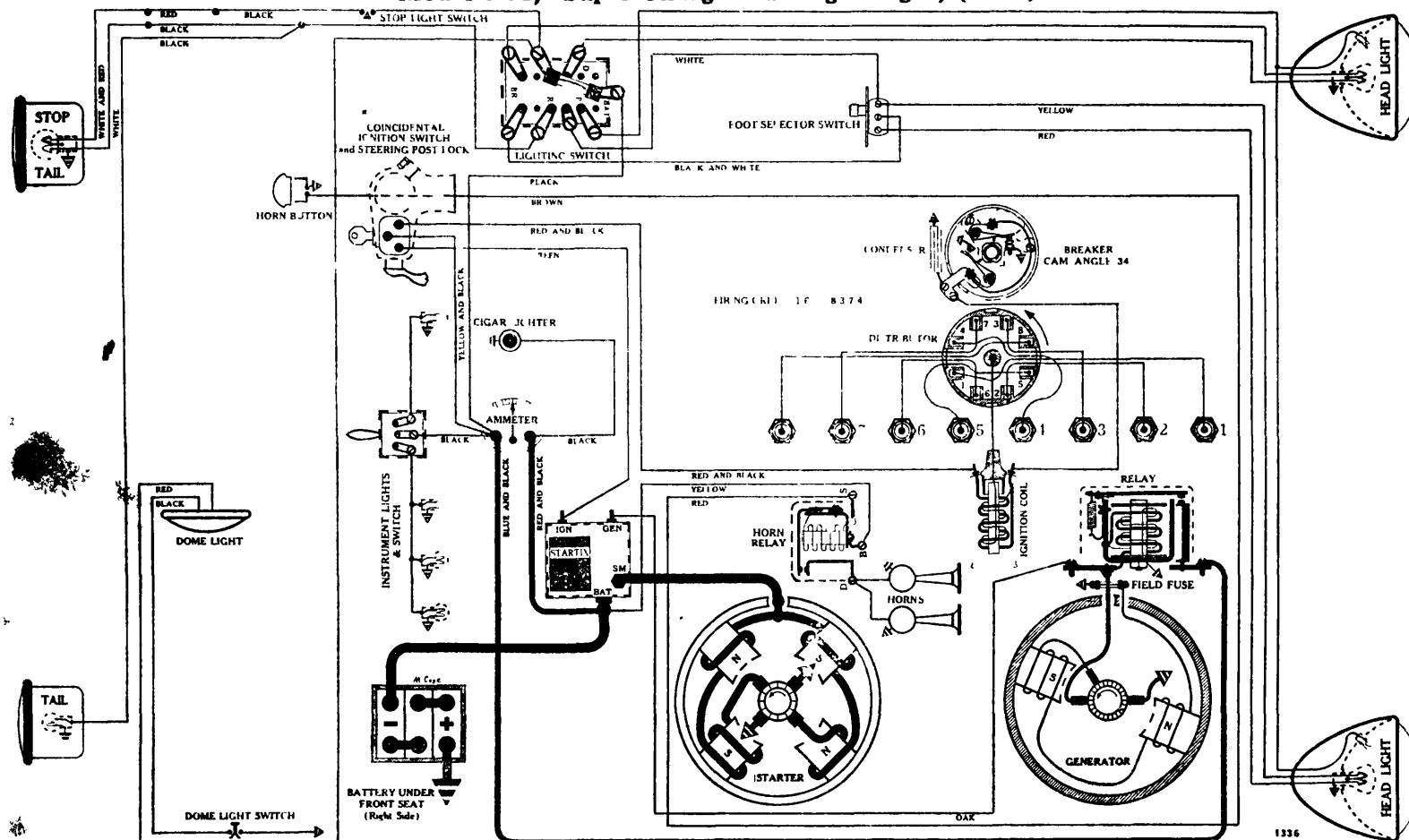
Auto-Lite, CB-4021

Closes— $6\frac{1}{4}$ to $7\frac{1}{2}$ volts.
Opens— $\frac{1}{2}$ to $2\frac{1}{2}$ amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .030 inch contacts closed

Switch—Soreng-Manegold, No. B-5640-A.
Location—Behind instrument board, operated by pull knob.
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.
 Spare fuse in clip on switch support.
Foot Selector Switch—Delco-Remy, 465-W.
Lamps—Refer to "Lamp Data" in Technical Section. **HEAD**—2320; **PARK**—63; **INSTRUMENT**—63; **DOME**—81; **STOP AND TAIL**—1158 (left fender); **TAIL**—63 (right fender).

AUBURN

Mod 18-51, "Super-Charged" Straight Eight, (1935)

**BATTERY**

U. S. L., XY-15-A, 6 volts. Positive Terminal Grounded
Starting Capacity—122 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.3.
Lighting Capacity—5.2 amps. for 20 hours (105 amp. hour).
Box—Length, 10½; width, 7; height, 8½ inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAB-4063

Connection to Engine—Bendix Drive, Type R11FX-10.
Running Free—60 amps. at 5½ volts, 3700 R.P.M.
Cranking Engine—275 to 300 amps. at 4.5 volts.
Lock Torque—15½ pound-feet, 582 amps. at 3 volts.
Brush Spring Tension—44 to 56 oz. on each (new brushes).
Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.
Armature—Auto-Lite, MAB-2006.

IGNITION

A-L Test No. 434 Rotation, L. H., Top View
 Auto-Lite, IGH-4027
 (Full Automatic Spark Advance)

Breakers—Contact separation .020 inch.
Cam Angles—Points closed 34 degrees; open 56 degrees (each breaker separately). Points closed 34 degrees; open 11 degrees (both operating).
Contact Spring Tension—17 to 19 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.
Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark (located 3 degrees or approximately one tooth ahead of mark "UDC 1-8") registers with indicator line at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—14-MM (Champion type J-9); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Automatic Advance—5½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
800	400		2
1950	975		3
2530	1265		5
3690	1845		5
4000 (Max.)	2000		5½

Ignition Coil—Auto-Lite, CE-4001.
Ignition Switch—Oakes Steering Post and Ignition Lock No. 301000.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4603-A-3 (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.2	10	1150	7.1
2	850	6.3	14	1400	7.6
4	900	6.5	16	1600	7.8
6	950	6.7	18	1800 (Max.)	8.
8	1050	7.			

Motoring Freely—5.2 amps. at 6 volts.
Max. Stall Current—24 to 26 amps. at 5½ volts.
Field Test—4.1 amps. at 6 volts across field coils in series.
Field Fuse—7½ amps. (Type 1A-7½).
Brush Spring Tension—36 oz. Max. on each (new brushes).
Armature—Auto-Lite, GAR-2077.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

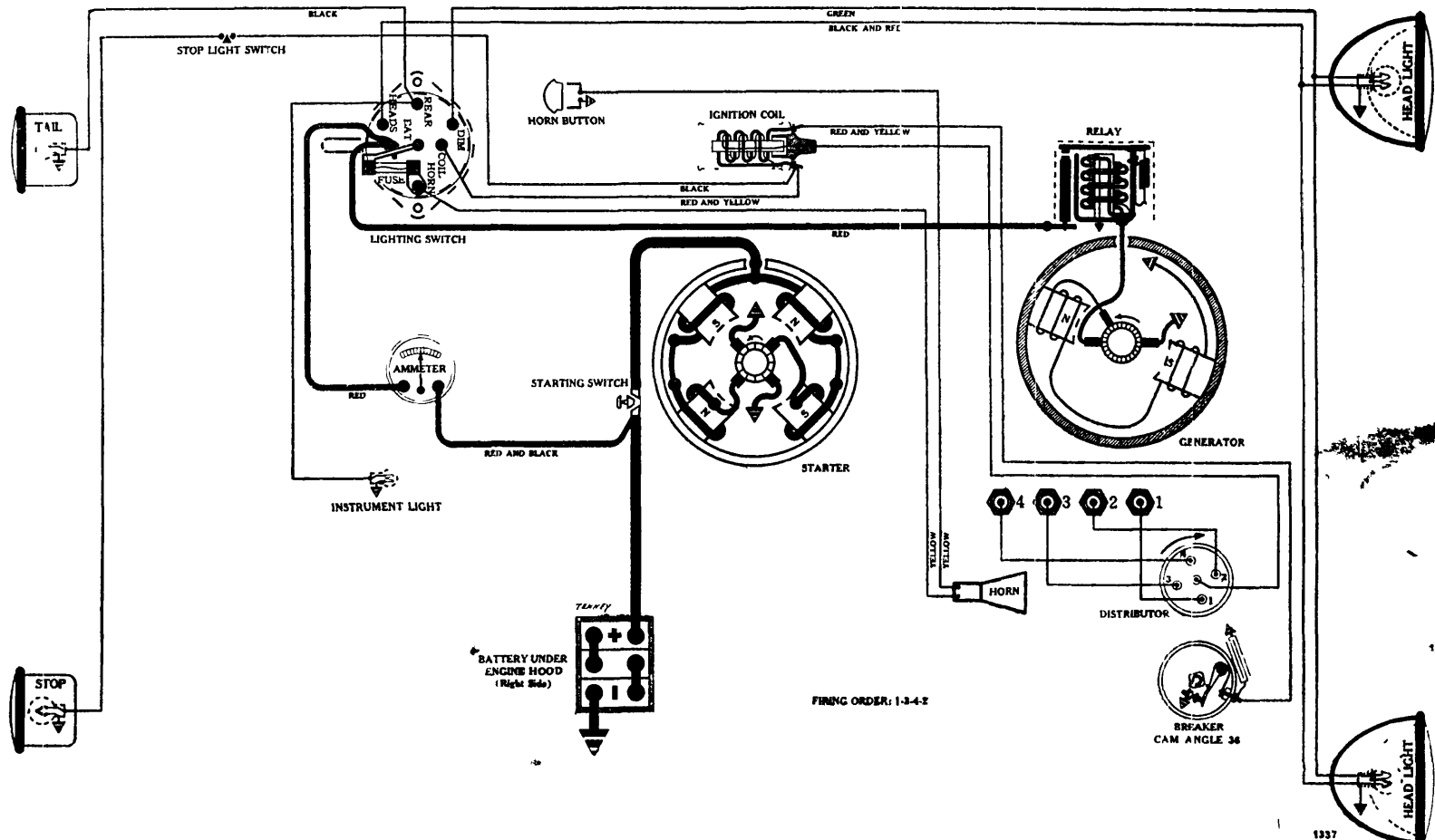
Closes—6¼ to 7½ volts.
Opens—½ to 2½ amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. A-5640-A.
Location—Behind instrument board, operated by pull knob.
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.
 Clock fuse, 6 amp. (type 1A-6) on clock.
Foot Selector Switch—Delco-Remy, 465-W.
Lamps—Refer to "Lamp Data" in Technical Section. **HEAD**—2320; **PARK**—63; **INSTRUMENT**—63; **DOME**—81; **STOP AND TAIL**—1158 (left fender); **TAIL**—63 (right fender).

AUSTIN

Model 4 cyl., (1935)



BATTERY

U.S.L., XY-9-A, 6 volts. Negative Terminal Grounded
 Starting Capacity—70 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—8.
 Lighting Capacity—3 amps. for 20 hours (60 amp. hour).
 Box—Length, 6-15/16; width, 7; height, 8 3/8 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAK-4001

Connection to Engine—Bendix Drive, Type RCE11-10.
 Running Free—35 amps. at 5 1/2 volts.
 Cranking Engine—130 amps. at 5.0 volts.
 Lock Torque—7 pound-feet, 520 amps., 4 volts.
 Brush Spring Tension—38 to 61 oz. on each (new brushes).
 Starting Switch—Auto-Lite, SW-4001.
 Armature—Auto-Lite, MAK-2006.

IGNITION

A-L Test No. 278 Rotation, R. H., Top View
 Auto-Lite, IGB-4086-A

Breaker—Contact separation .020 inch.
 Cam Angles—Points closed 36 degrees; open 54 degrees.
 Contact Spring Tension—17 to 19 oz.
 Timing—Use MOTOR GAUGE. Remove No. 1 spark plug and attach MOTOR GAUGE, using adapter No. 104 and rod No. 8. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when .020 inch (low compression head) or .004 inch (high compression head) before T D C, as indicated on Gauge. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
 Spark Plugs—18-MM (Champion type C-7); Gap .030 inch.
 Firing Order—1-3-4-2.
 Automatic Advance—11 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
1000	500	2
1400	700	4
1800	900	6
2200	1100	8
2800 (Max.)	1400	11

 Ignition Coil—Auto-Lite, IG-4065.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAS-4104-B, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	825	6.4	12	1800	7.7
3	1000	6.8	14	2400 (Max.)	8.
6	1200	7.	14	2800	8.
9	1400	7.4			

Motoring Freely—4 1/2 amps. at 6 volts.
 Max. Stall Current—29 amps at 6 volts.
 Field Test—3.8 amps. at 6 volts across field coils in series.
 Brush Spring Tension—20 oz. Max. on each (new brushes).
 Armature—Auto-Lite, GAS-2076.
 Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014

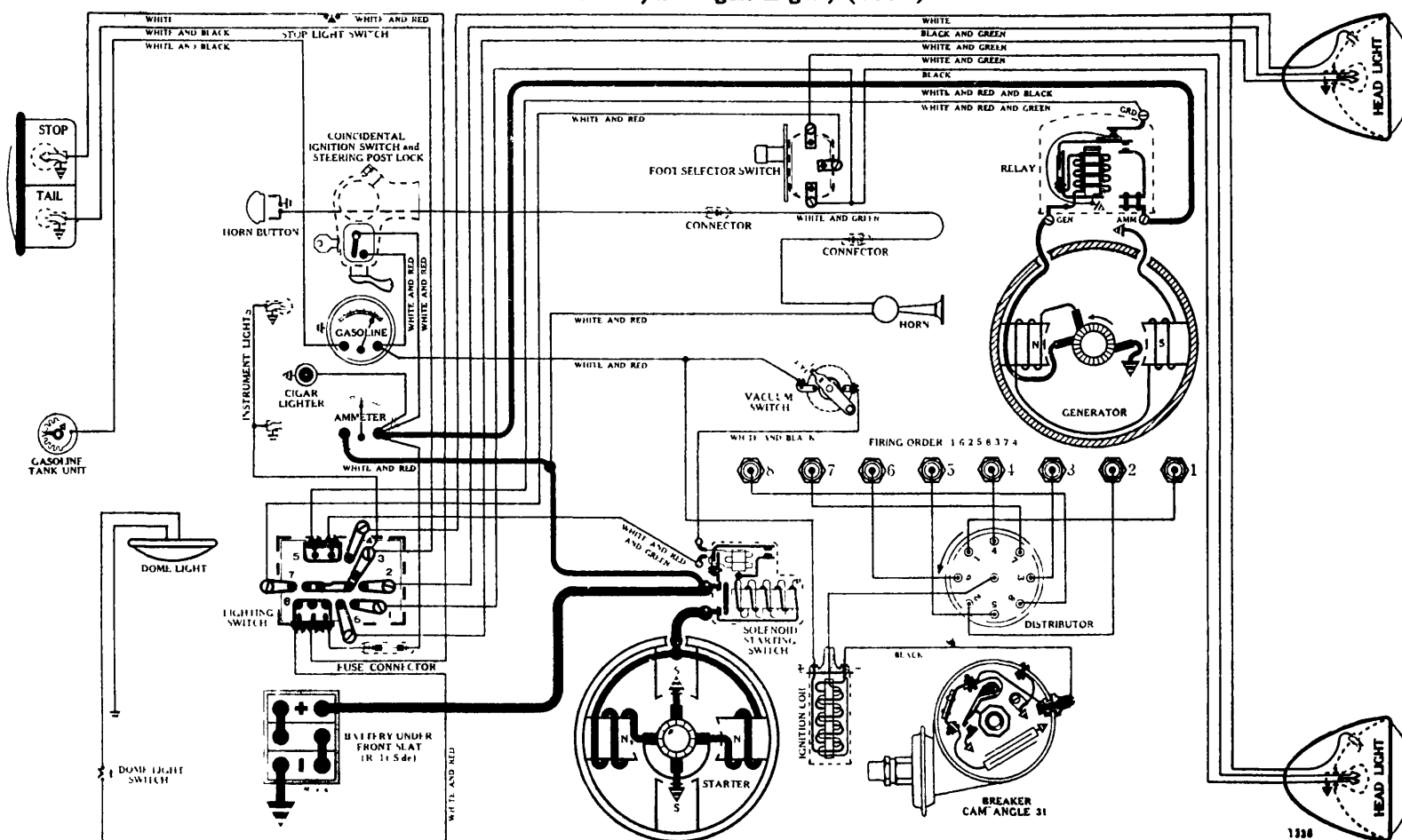
Closes—6 3/4 to 7 1/2 volts.
 Opens—1/2 to 2 1/2 amps. discharge.
 Contact Gap—.025 to .035 inch.
 Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Briggs & Stratton No. 50518, Combination Lighting and Ignition.
 Location—On instrument board.
 Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.
 Lamps—Refer to "Lamp Data" in Technical Section. HEAD—1158; INSTRUMENT—63; STOP—87; TAIL—63.

BUICK

Series 35-40, Straight Eight, (1935)



BATTERY

Delco-Remy, 13-J, 6 volts. Negative Terminal Grounded
 Starting Capacity—117 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—3.
 Lighting Capacity—4.9 amps. for 20 hours (98 amp. hour).
 Box—Length, 9-1/16; width, 7; height, 9 1/2 inches.

STARTER

D-R Test No. 402 Rotation, L. H., Com. End
 Delco-Remy, 734-Z

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch, remote control relay (located in solenoid unit), and an auxiliary set of grounding points found on cut-out relay.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—175 to 190 amps. at 4.9 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1512.

Vacuum Starting Control Switch—Delco-Remy, 1594.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test No. 1000 Rotation, L. H., Top View
 Delco-Remy, 663-E

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-R Vacuum Advance Unit, which controls position of Breaker Plate.)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "Adv" (cut in flywheel and filled with white paint; located 2 degrees ahead of T.D.C.) is opposite index line on flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open. This setting is for regular gasoline. When Ethyl gasoline is used the ignition should have an advance of 8 degrees (flywheel). As only a 2 degree flywheel advance mark is provided, the engine must first be timed for regular gasoline. Next loosen dist. mounting screws and turn complete distributor in a clockwise direction until index line on pointer is three graduations from the center line of scale. Relock mounting screws.

Spark Plugs—18-MM (AC type H-9); Gap .020 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance—5 to 6 1/2 degrees (Distributor). Starts with vacuum of from 5 to 7 inches of mercury. Requires vacuum of from 10 to 13 inches for full travel.

Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
420	210	Start
580	290	8
800 (Intermediate)	400	7
1700	850	11
2600 (Max.)	1300	15

Ignition Coil—Delco-Remy, 528-H.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301030.

Ignition Lock Number—Briggs & Stratton 45654.

Ignition Key Series—Briggs & Stratton 5000-5999.

Ignition Key Blank Number—Briggs & Stratton 72740.

GENERATOR

D-R Test No. 1243 Rotation, L. H., Com. End

Delco-Remy, 936-C, (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.5	12	1200	7.5
4	800	6.8	18	1800	8.
8	960	7.1	20	2400 (Max.)	8.2

Motoring Freely—3 1/2 amps. at 6 volts.

Max. Stall Current—25 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAYS

Cut-Out Relay, Delco-Remy 270-B (on engines No. 42960509 and up)

Closes—6.7 to 7.5 volts.

Opens—0 to 3.5 amps. discharge.

Contact Gap—.018 to .025 inch.

Core Gap—.018 to .022 inch, contacts closed.

Spring Tension—6.2 oz. (minimum) to open upper contacts.

Optional Equipment, Delco-Remy 5589 Voltage Operated Two-Stage Regulator

For details of operation and instructions for adjusting see Technical Section

LIGHTING

Switch—Delco-Remy, 478-S.

Location—Behind instrument board, operated by pull knob.

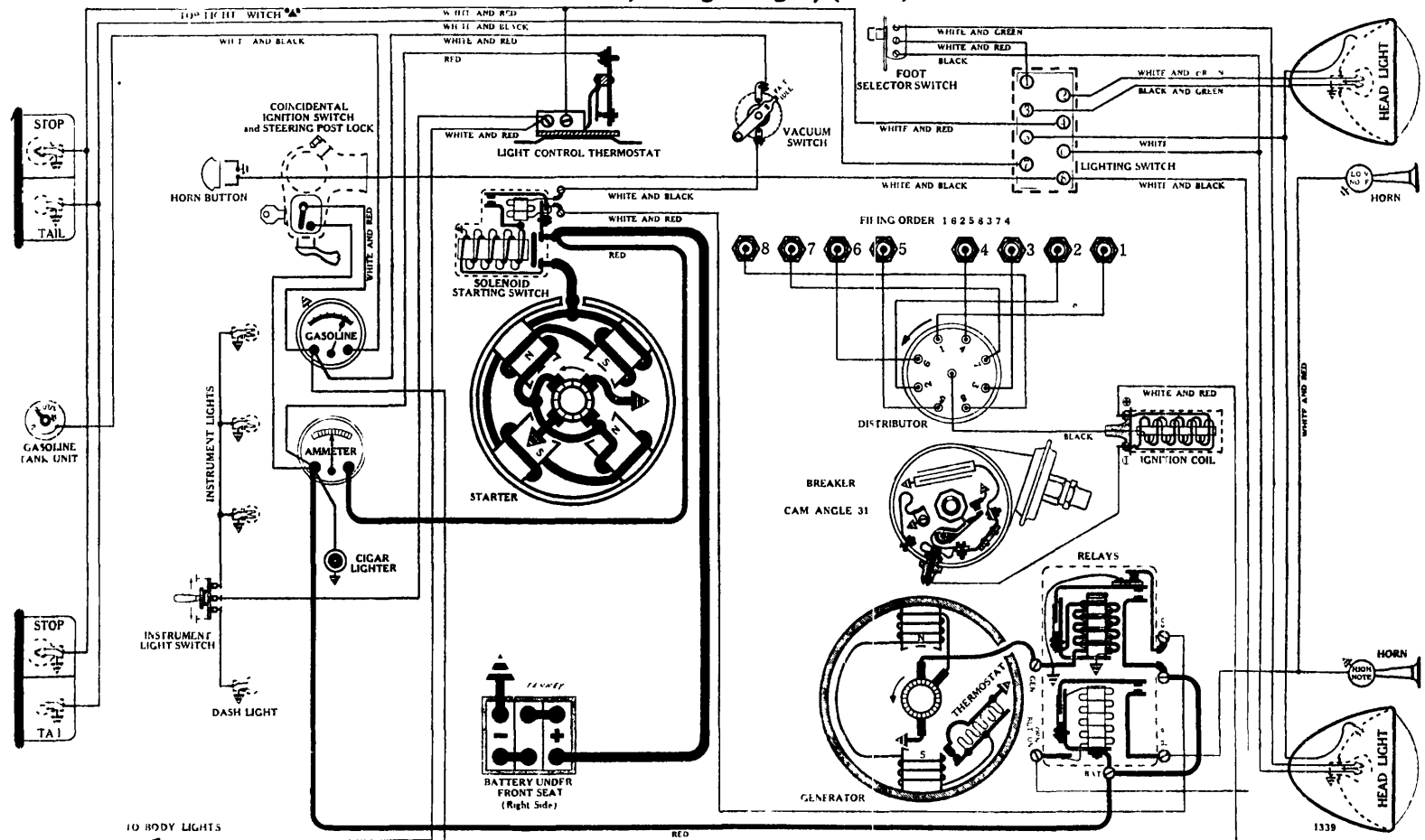
Fuses—Single 30 amp. fuse (type 3A-30) in tubular holder found on wire connecting ammeter to No. 8 terminal on lighting switch.

Foot Selector Switch—Delco-Remy, 465-R.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—63; INSTRUMENT—63; DOME—81; STOP—81; TAIL—63.

BUICK

Series 35-50, Straight Eight, (1935)



BATTERY

Delco-Remy, 13-J, 6 volts. Negative Terminal Grounded
Starting Capacity—117 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.
Lighting Capacity—4.9 amps. for 20 hours (98 amp. hour).
Box—Length, 9-1/16; width, 7; height, 9 1/4 inches.

STARTER

D-R Test No. 395 Rotation, L. H., Com. End
Delco-Remy, 727-G

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch, remote control relay (located in solenoid unit), and an auxiliary set of grounding points found on cut-out relay.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—170 to 185 amps. at 5.1 volts.

Lock Torque—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1518.

Vacuum Starting Control Switch—Delco-Remy, 1587.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test No. 1001 Rotation, L. H., Top View
Delco-Remy, 663-C

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-H Vacuum Advance Unit, which controls position of Breaker Plate.)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—IMPORTANT! First set octane selector to extreme "high", and timing plate in advanced position. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "Adv" (cut in flywheel 7 degrees ahead of the "T.D.C." mark) is opposite index line on flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (AC type H-9); Gap .020 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance—5 to 6 1/2 degrees (Distributor). Starts with vacuum of from 5 to 7 inches of mercury. Requires vacuum of from 10 to 13 inches for full travel.

Automatic Advance—10 1/2 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
420	210	Start
530	290	3
690	345	5
800 (Intermediate)	400	7
1250	625	9
1600 (Max.)	800	10 1/2

Ignition Coil—Delco-Remy, 528-H.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 300917.

Ignition Lock Number—Briggs & Stratton 45349.

Ignition Key Series—Briggs & Stratton 5000-5999.

Ignition Key Blank Number—Briggs & Stratton 72740.

GENERATOR

D-R Test No. 1215-A Rotation, L. H., Com. End
Delco-Remy, 956-H

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.3	16	1160	7.8
4	680	6.7	20	1520	8.
12	950	7.4	22	2000 (Max.)	8.3

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—3 amps. at 6 volts (without distributor).

Max. Stall Current—25 to 26 amps. at 6 volts.

Field Test—2.1 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 26 oz. on each (new brushes).

Armature—Delco-Remy, 1845920.

Third Brush Adjustment—Not necessary to loosen cover band. Loosen hex. locking screw approx. one turn. Insert blade of screw driver between jaws of adjusting mechanism. Pushing screw driver towards engine lowers charging rate. Relock.

RELAYS

Delco-Remy, 264-H

(A combination of Cut-Out Relay and Horn Relay)

Cut-Out Relay—Closes—6 1/2 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

Horn Relay—

Armature Spring Tension—6 to 8 oz.

Closes—2 volts minimum.

Opens—.8 amps. (reverse current).

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

Solenoid Relay

(Located in Solenoid Unit):

Closes—3.6 to 4 volts (max.).

Opens—1.6 to 2. volts.

Contact Gap—.030 to .045 inch.

Core Gap—.010 to .014 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 487-F.

Thermostatic Lighting Current Limit Relay—Delco-Remy, 411-A.

Foot Selector Switch—Delco-Remy, 465-R.

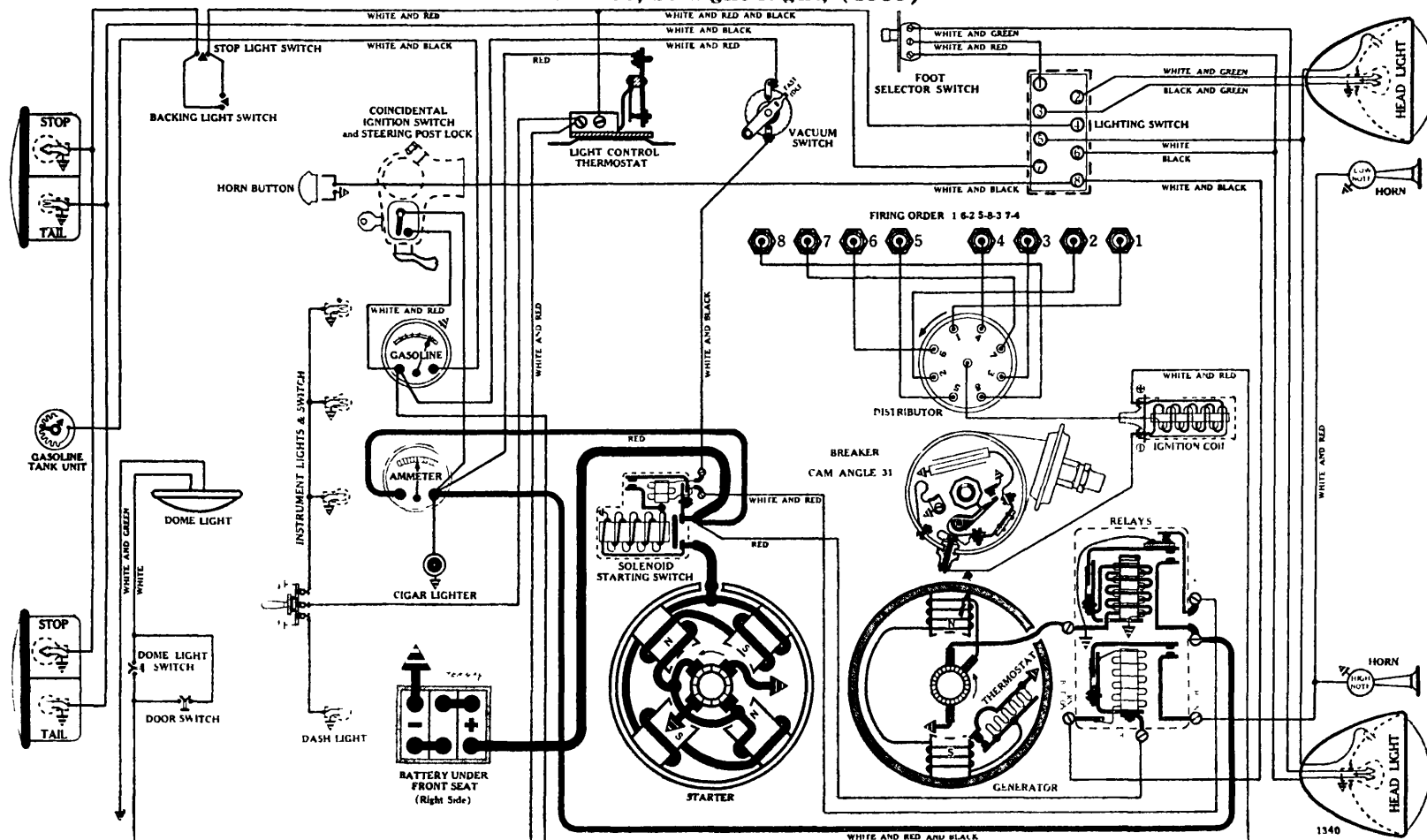
Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2330;

PARK—63; INSTRUMENT—68; DOME—81; STOP—87;

TAIL—68.

BUICK

Series 35-60, Straight Eight, (1935)



BATTERY

Delco-Remy, 15-G, 6 volts. Negative Terminal Grounded

Starting Capacity—137 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—4.

Lighting Capacity—5.7 amps. for 20 hours (114 amp. hour).

Box—Length, 10-9/32; width, 7; height, 9 1/8 inches.

STARTER

D-R Test No. 396 Rotation, L. H., Com. End

Delco-Remy, 727-F

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch, remote control relay (located in solenoid unit), and an auxiliary set of grounding points found on cut out relay.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—185 to 200 amps. at 5.1 volts.

Lock Torque—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1512.

Vacuum Starting Control Switch—Delco-Remy, 1587.

Armature—Delco-Remy, 820158.

IGNITION

D-R Test No. 1000 Rotation, L. H., Top View

Delco-Remy, 663-A

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-H Vacuum Advance Unit, which controls position of Breaker Plate.)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—IMPORTANT! First set octane selector to extreme "high", and timing plate in advanced position. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "Adv" (cut in flywheel 11 degrees ahead of the "T.D.C." mark) is opposite index line on flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (AC type H-9); Gap .020 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance—5 to 6 1/2 degrees (Distributor). Starts with vacuum of from 5 to 7 inches of mercury. Requires vacuum of from 10 to 13 inches for full travel.

Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
420	210		4
640	320		7
800 (Intermediate)	400		11
1700	850		15
2600 (Max.)	1300		

Ignition Coil—Delco-Remy, 528-H.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 300914.

Ignition Lock Number—Briggs & Stratton 45349.

Ignition Key Series—Briggs & Stratton 5000-5999.

Ignition Key Blank Number—Briggs & Stratton 72740.

GENERATOR

D-R Test No. 1215-A Rotation, L. H., Com. End

Delco-Remy, 956-H

Performance Data—Gen. cold. Thermostat closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.3	16	1160	7.8
4	680	6.7	20	1520	8.
12	950	7.4	22	2000 (Max.)	8.3

NOTE:—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%

Motoring Freely—3 amps. at 6 volts (without distributor).

Max. Stall Current—25 to 26 amps. at 6 volts.

Field Test—2.1 amps. at 6 volts across field coils in series.

Brush Spring Tension—20 to 26 oz. on each (new Brushes).

Armature—Delco-Remy, 1845920.

Third Brush Adjustment—Not necessary to loosen cover band. Loosen hex. locking screw approx. one turn. Insert blade of screw driver between jaws of adjusting mechanism. Pushing screw driver towards engine lowers charging rate. Relock.

RELAYS

Delco-Remy, 264-H

(A Combination of Cut-Out Relay and Horn Relay)

Cut-Out Relay—Closes—6 1/4 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

Horn Relay—Armature Spring Tension—6 to 8 oz.

Closes—2 volts minimum.

Opens—.8 amps. (reverse current).

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

Solenoid Relay (Located in Solenoid Unit):

Closes—3.6 to 4 volts (max.).

Opens—1.6 to 2. volts.

Contact Gap—.030 to .045 inch.

Core Gap—.010 to .014 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 487-F.

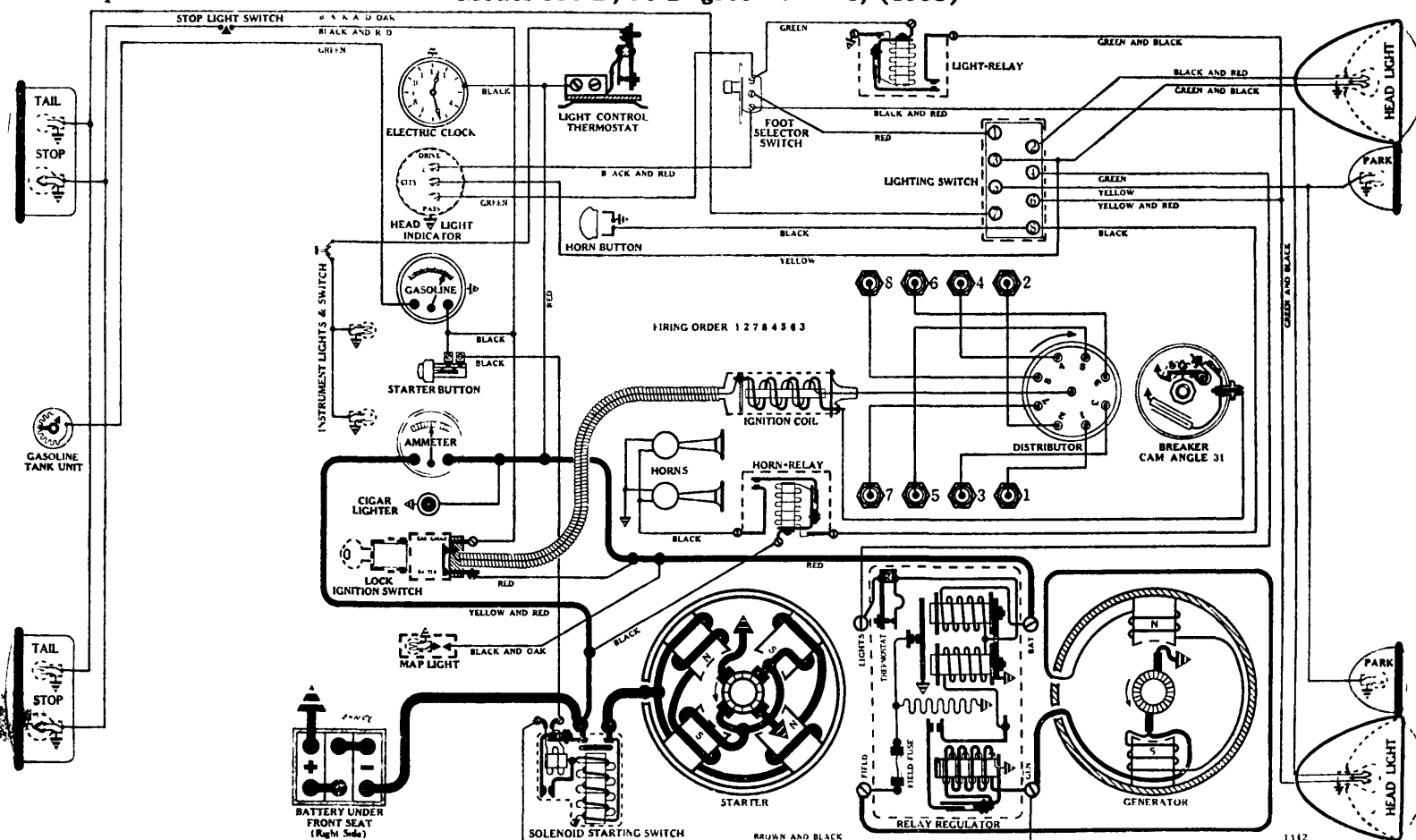
Thermostatic Lighting Current Limit Relay—Delco-Remy, 411-A.

Foot Selector Switch—Delco-Remy, 465-R.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2330; PARK—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

CADILLAC

Model 355-D, 90 D gree "V" 8, (1935)



BATTERY

Delco-Remy, 17-D, 6 volts. Positive Terminal Grounded
Starting Capacity—156 amps. for 20 minutes.
Minutes of Discharge at 300 amps., Zero Degrees F.—5.
Lighting Capacity—6.5 amps. for 20 hours (130 amp. hour).
Box—Length, 11 $\frac{1}{4}$; width, 7; height, 9 $\frac{3}{8}$ inches.

STARTER

D-R Test No. 404 Rotation, L. H., Com. End
 Delco-Remy, 728-U

Connection to Engine—Mechanical pinion shift with self-contained gear reduction and over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board working in conjunction with a remote control relay (located in solenoid unit), the control relay being grounded through the generator.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843058.

Running Free—70 amps. at 5 volts, 2500 R.P.M.

Cranking Engine—250 to 270 amps. at 5 volts.

Lock Torque—28 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1514 or 1521.

Push Button Starting Control Switch—Delco-Remy, 1379.

Armature—Delco-Remy, 818134.

IGNITION

D-R Test No. 1038 Rotation, R. H., Top View
 Delco-Remy, 661-V

(Full Automatic Spark Advance)

Breaker—Contact separation .012 to .018 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel "IG-A" (which is 4 degrees or approximately $\frac{1}{2}$ inch ahead of T.D.C.) is opposite indicator. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (AC type G-6); Gap .025 to .027 inch.

Firing Order—1-2-7-8-4-5-6-3.

NOTE:—All odd cylinder numbers on right bank, No. 1 nearest radiator. All even numbers on left bank (see diagram).

Automatic Advance—12 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
920	460	Start
1160	580	2
1400	700	4
1780	890	7
2160	1080	10
2400 (Max.)	1200	12

Ignition Coil—Delco-Remy, 539-D.

Ignition Switch & Cable—Delco-Remy, 431-DA.

Ignition Lock Number—Briggs & Stratton 45351.

Ignition Key Series—Briggs & Stratton 6000-6999.

Ignition Key Blank Number—Briggs & Stratton 72735.

GENERATOR

D-R Test No. 1248 Rotation, L. H., Com. End

Delco-Remy, 933-B (Air Cooled)

NOTE:—This unit is a straight shunt generator with no third brush. Generator output is controlled by a vibrating point current regulator working in conjunction with the lamp load. The regulator must be used when testing these generators.

Generator data same as Cadillac "Vee" 16, 1935.

RELAY-REGULATOR

Same as Cadillac "Vee" 12, 1935.

LIGHTING

Switch—Delco-Remy, 487-H or 487-J.

Horn Relay—Delco-Remy, 266-T.

Thermostatic Lighting Current Limit Relay—Delco-Remy, 411-A.

Lighting Relay—Delco-Remy, 266-T.

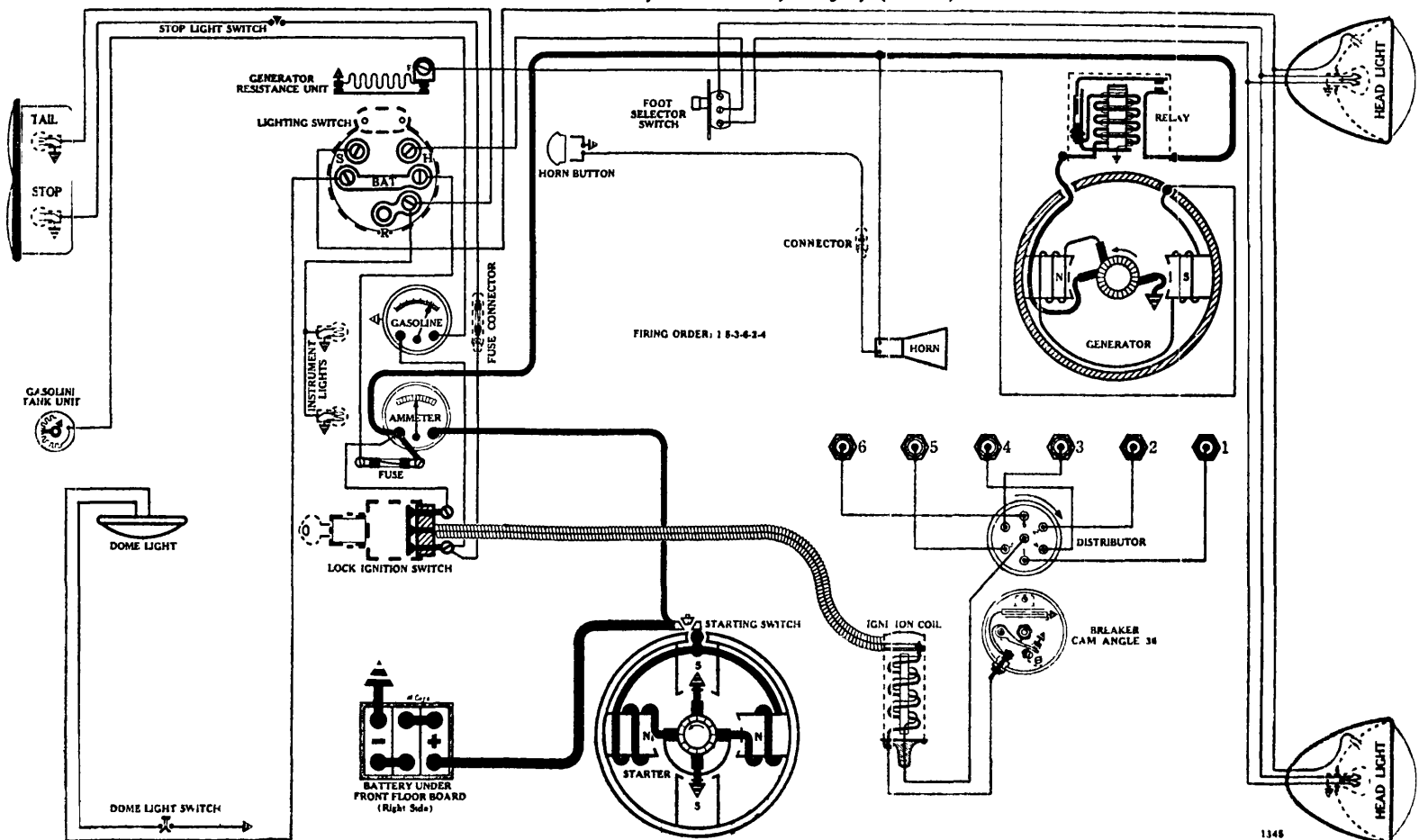
Foot Selector Switch—Delco-Remy, 465-Z.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2330;

PARK—63; INSTRUMENT—63; INDICATOR—50; DOME—81; STOP—87; TAIL—63.

CHEVROLET

Mod 1 "Master", Series EA, 6 cyl., (1935)



BATTERY

Delco-Remy, 15-X, 6 volts. Negative Terminal Grounded
 Starting Capacity—115 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—2.75.
 Lighting Capacity—4.7 amps. for 20 hours (94 amp. hour).
 Box—Length, 9-1/16; width, 7; height, 8 5/8 inches.

STARTER

D-R Test No. 368 Rotation, L. H., Com. End
 Delco-Remy, 738-G

Connection to Engine—Bendix Drive, Type A-1718.
 Running Free—65 amps. at 5 volts, 5000 R.P.M.
 Cranking Engine—170 to 180 amps. at 5.2 volts.
 Lock Torque—12 pound-feet, 475 amps., 3.6 volts.
 Brush Spring Tension—24 to 28 oz. on each (new brushes).
 Starting Switch—Delco-Remy, 362941.
 Starterator Vacuum Unit—Delco-Remy, 1575.
 Armature—Delco-Remy, 1847432.

IGNITION

D-R Test No. 1070 Rotation, R. H., Top View
 Delco-Remy, 645-G
 (Full Automatic Spark Advance in conjunction with Delco-Remy
 680-V Vacuum Control.)

Breaker—Contact separation .018 inch.
 Cam Angles—Points closed 36 degrees; open 24 degrees.
 Contact Spring Tension—17 to 21 oz.
 Timing—IMPORTANT! First set pointer on octane selector at zero graduation. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when steel ball, pressed in flywheel (located 5 degrees or approx. 2 flywheel teeth ahead of T.D.C.) is opposite pointer at opening in right side of flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open. This is initial setting. Check with Neon Timing Light.
 Spark Plugs—14-MM (AC type K-11); Gap .032 inch.
 Firing Order—1-5-3-6-2-4.
 Vacuum Advance—8 to 9 degrees (Distributor). Starts with vacuum of 5 inches mercury. Requires vacuum of from 9 to 11 inches of mercury for full travel.
 Octane Selector—10 degrees advance or retard (Distributor).
 Automatic Advance—16 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
490	245		2
800	400		9
1900	950		18
2530	1265		18
3000 (Max.)	1500		16

Ignition Coil—Delco-Remy, 586-D.
 Ignition Switch and Cable—Delco-Remy, 431-P.
 Ignition Lock Number—Briggs & Stratton 45792.
 Ignition Key Series—Briggs & Stratton 8000-9499.
 Ignition Key Blank Number—Briggs & Stratton 82078.

GENERATOR

D-R Test No. 1250 Rotation, L. H., Com. End

Delco-Remy, 935-V (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	F.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	12	1250	7.5
4	875	6.9	16	1600	7.9
8	1000	7.2	20	2400 (Max.)	8.2

Motoring Freely—3 1/2 to 4 amps. at 6 volts.
 Max. Stall Current—32 to 34 amps. at 6 volts.
 Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.
 Brush Spring Tension—Main brushes 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAY

Delco-Remy, 265-G

Closes—6 3/4 to 7 1/2 volts.
 Opens—0 to 2 1/2 amps. discharge.
 Contact Gap—.015 to .025 inch.
 Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 479-Y (with generator field resistance).

NOTE:—This switch is so designed that by pulling knob one position, the field resistance is shorted out, resulting in maximum charging, with no lights burning.

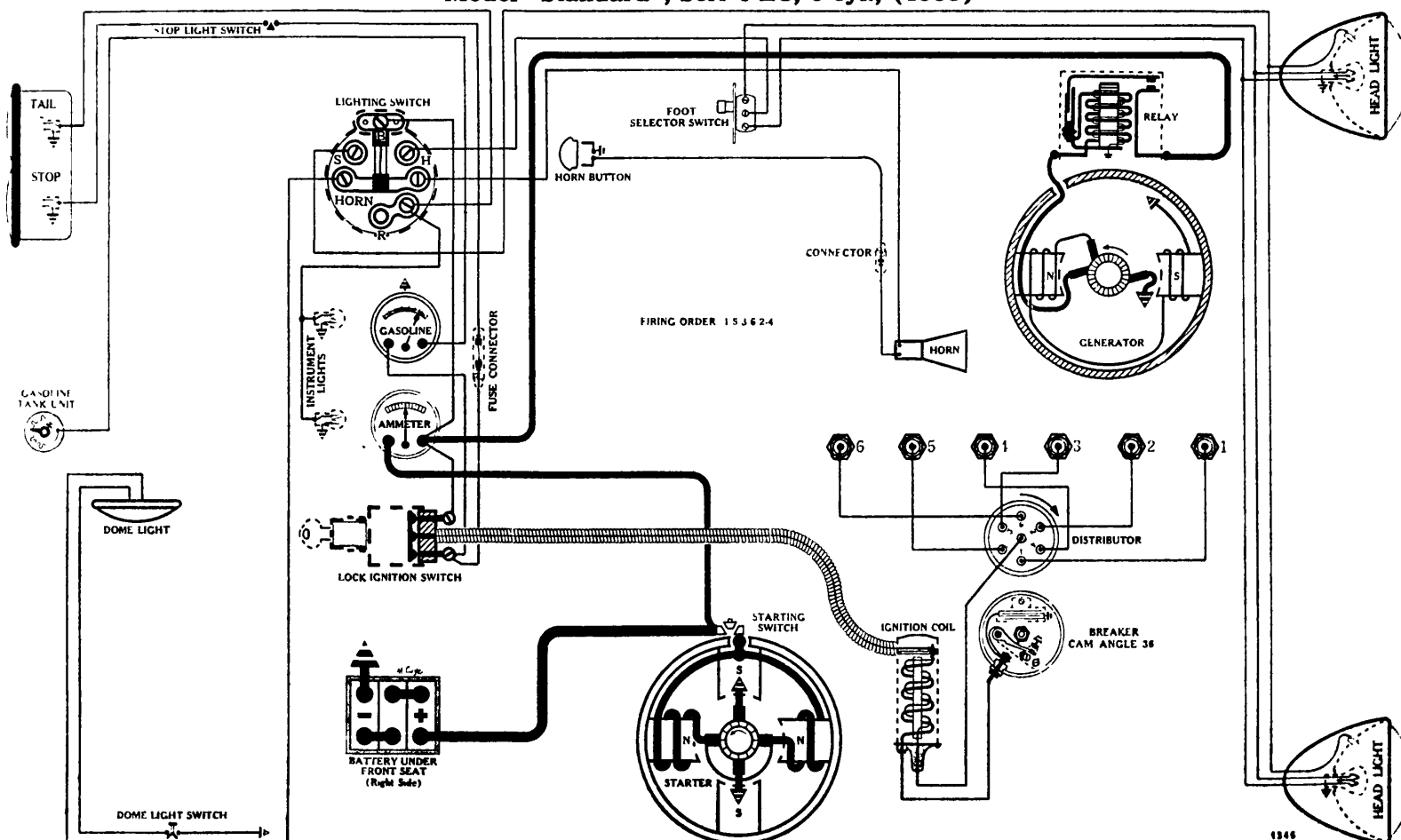
Fuses—Lighting Circuit, Single 20 amp. fuse (type 3A-20) mounted below ammeter. Stop Light Circuit, Single 20 amp. fuse (type 3A-20) in tubular holder in wire behind instrument board, near ignition switch.

Foot Selector Switch—Delco-Remy, 471-W.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; INSTRUMENT—63; DOME—81; STOP—63; TAIL—63.

CHEVROLET

Model "Standard", Series EC, 6 cyl., (1935)



BATTERY

Delco-Remy, 13-A, 6 volts. Negative Terminal Grounded

Starting Capacity—102 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—2.75.
Lighting Capacity—4.3 amps. for 20 hours (86 amp. hour).
Box—Length, 9-1/16; width, 7; height, 8 3/8 inches.

STARTER

D-R Test N . 368 Rotation, L. H., Com. End
Delco-Remy, 738-G

Connection to Engine—Bendix Drive, Type A-1718.
Running Free—65 amps. at 5 volts, 5000 R.P.M.
Cranking Engine—170 to 180 amps. at 5.2 volts.
Lock Torque—12 pound-feet, 475 amps., 3.6 volts.
Brush Spring Tension—24 to 28 oz. on each (new brushes).
Starting Switch—Delco-Remy, 362941.
Armature—Delco-Remy, 1847432.

IGNITION

D-R Test No. 1070 Rotation, R. H., Top View
Delco-Remy, 645-G

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-L Vacuum Control.)

Breaker—Contact separation .018 inch.
Cam Angles—Points closed 36 degrees; open 24 degrees.
Contact Spring Tension—17 to 21 oz.

Timing—IMPORTANT! First set pointer on octane selector at zero graduation. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when steel ball, pressed in flywheel (located 5 degrees or approx. 2 flywheel teeth ahead of T.D.C.) is opposite pointer at opening in right side of flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open. This is initial setting. Check with Neon Timing Light.

Spark Plugs—14-MM (AC type K-11); Gap .032 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance—8 to 9 degrees (Distributor). Starts with vacuum of 5 inches mercury. Requires vacuum of from 9 to 11 inches of mercury for full travel.

Octane Selector—10 degrees advance or retard (Distributor).

Automatic Advance—16 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
490	245	Start
800	400	2
1900	950	9
2530	1265	13
3000 (Max.)	1500	16

Ignition Coil—Delco-Remy, 536-D.

Ignition Switch & Cable—Delco-Remy, 431-P.

Ignition Lock Number—Briggs & Stratton 45792.

Ignition Key Series—Briggs & Stratton 8000-9499.

Ignition Key Blank Number—Briggs & Stratton 82078.

GENERATOR

D-R Test No. 268 Rotation, L. H., Com. End
Delco-Remy, 943-J (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.5	12	1060	7.7
4	700	6.9	16	1400	8.1
8	850	7.3	18	1700 (Max.)	8.3

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—3 1/2 to 4 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each (new brushes).

Armature—Delco-Remy, 817221.

Third Brush Adjustment—Loosen cover band. Loosen third brush adjustment lock screw on outside of commutator end frame. Shift third brush by hand. Relock.

RELAY

Delco-Remy, 265-G

Closes—6 3/4 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-H.

Location—Behind instrument board. Operated by pull knob.

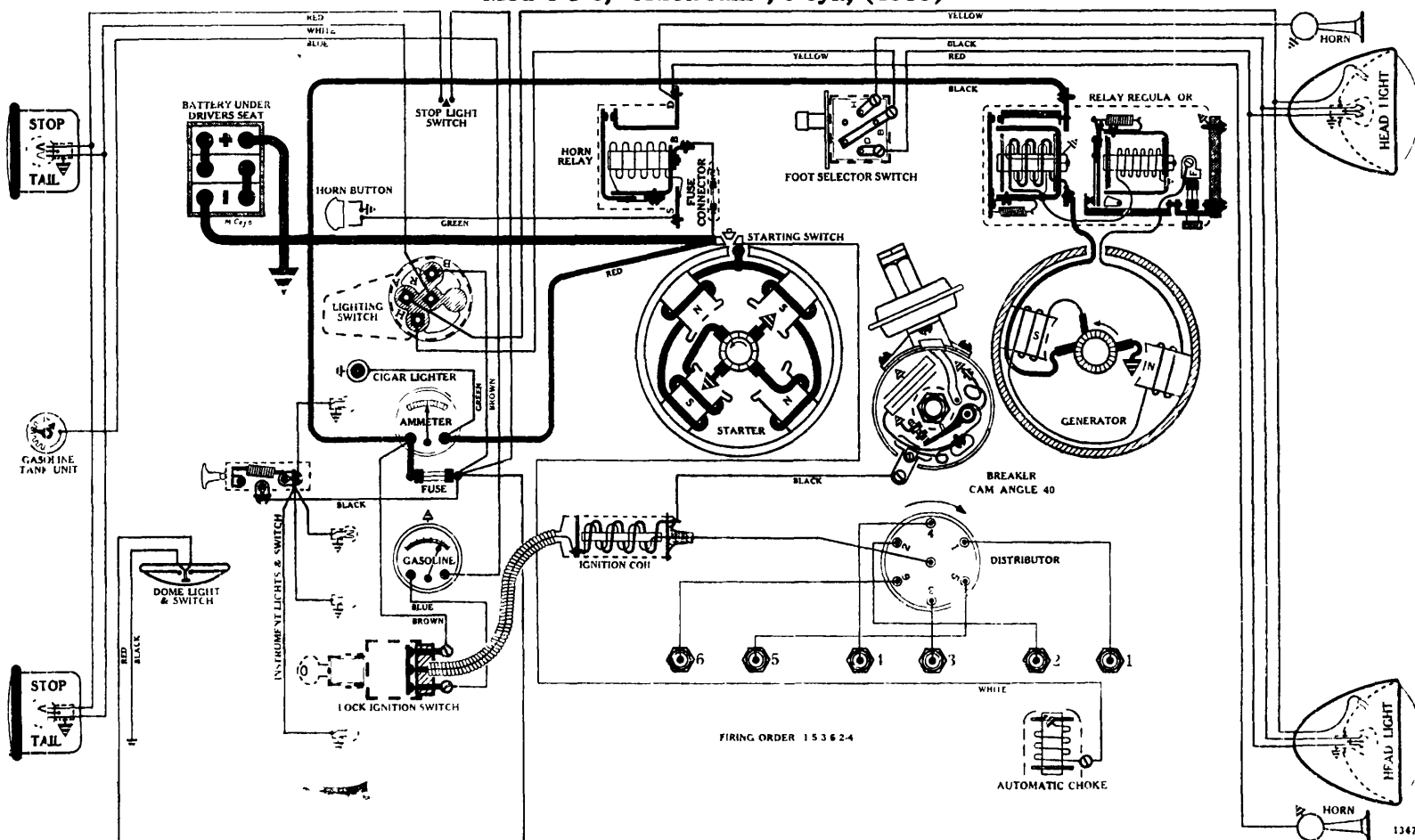
Fuses—Lighting Circuit, Single 20 amp. fuse (type 3A-20) mounted on switch back. Stop Light Circuit, Single 20 amp. fuse (type 3A-20) in tubular holder in wire behind instrument board, near ignition switch.

Foot Selector Switch—Delco-Remy, 471-W.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; INSTRUMENT—63; DOME—81; STOP—63; TAIL—63.

CHRYSLER

Mod 1 C-6, "Airstream", 6 cyl., (1935)



BATTERY

Willard, WH-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—140 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—4.3.
Lighting Capacity—5.9 amps. for 20 hours (119 amp. hour).
Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAX-4002

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.
Starter Pinion and Clutch Assembly—Auto-Lite, MAD-3099.
Running Free—65 amps. at 5½ volts, 5300 R.P.M.
Cranking Engine—200 amps. at 5 volts.
Lock Torque—16½ pound-feet, 640 amps. at 3 volts.
Brush Spring Tension—31 to 42 oz. on each (new brushes).
Starting Switch—Auto-Lite, SW-2813.
Armature—Auto-Lite, MAW-2080.

IGNITION

A-L Test No. 423 Rotation, R. H., Top View
Auto-Lite, IGS-4001

(Full Automatic Spark Advance in conjunction with Auto-Lite IGS-1023-S Vacuum Advance Unit, which controls position of Breaker Plate.)

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 40 degrees; open 20 degrees.
Contact Spring Tension—17 to 19 oz.
Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "zero" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) is directly under pointer on gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—14-MM (AC type K-9); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Automatic Advance—12 degrees (Distributor).
Vacuum Advance—9 degrees (Distributor). Starts with vacuum of from 4 to 5 inches of mercury. Requires vacuum of 12 inches for full travel.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
700	350	Start
800 (Intermediate)	400	3
1650	825	7
2280	1140	10
2700 (Max.)	1350	12

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4617 (Sedan); A-L, IG-4618 (Coupe).

Ign. Coil Only—A-L, IG-3224-S on both.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-ZS (Sedan); CE-1187-US (Coupe).

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4608-5 (Belt Drive, Air Cooled).

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	12	1275	7.4
4	875	6.8	16	1600	7.8
8	1075	7.	21	2400 (Max.)	8.1

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.

Field Fuse—5 amp. (type 1A-5) in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116-F.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4301-A

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.5 to 7.3 volts.

Opens—0 to 3 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

Regulator—

Contact Spring Tension—10 to 12 oz.

Points Open—8.3 volts.

Points Close—7.2 volts.

Contact Opening—.005 inch (minimum).

Core Gap—.020 inch (contacts closed).

LIGHTING

Switch—Douglas, No. 5374.

Location—Behind instrument board.

Fuses—(Lighting) Single 20 amp. fuse (type 3A-20), mounted on back of ammeter. (If dual horns), 20 amp. (type 3A-20) in fuse connector on wire close to starting motor.

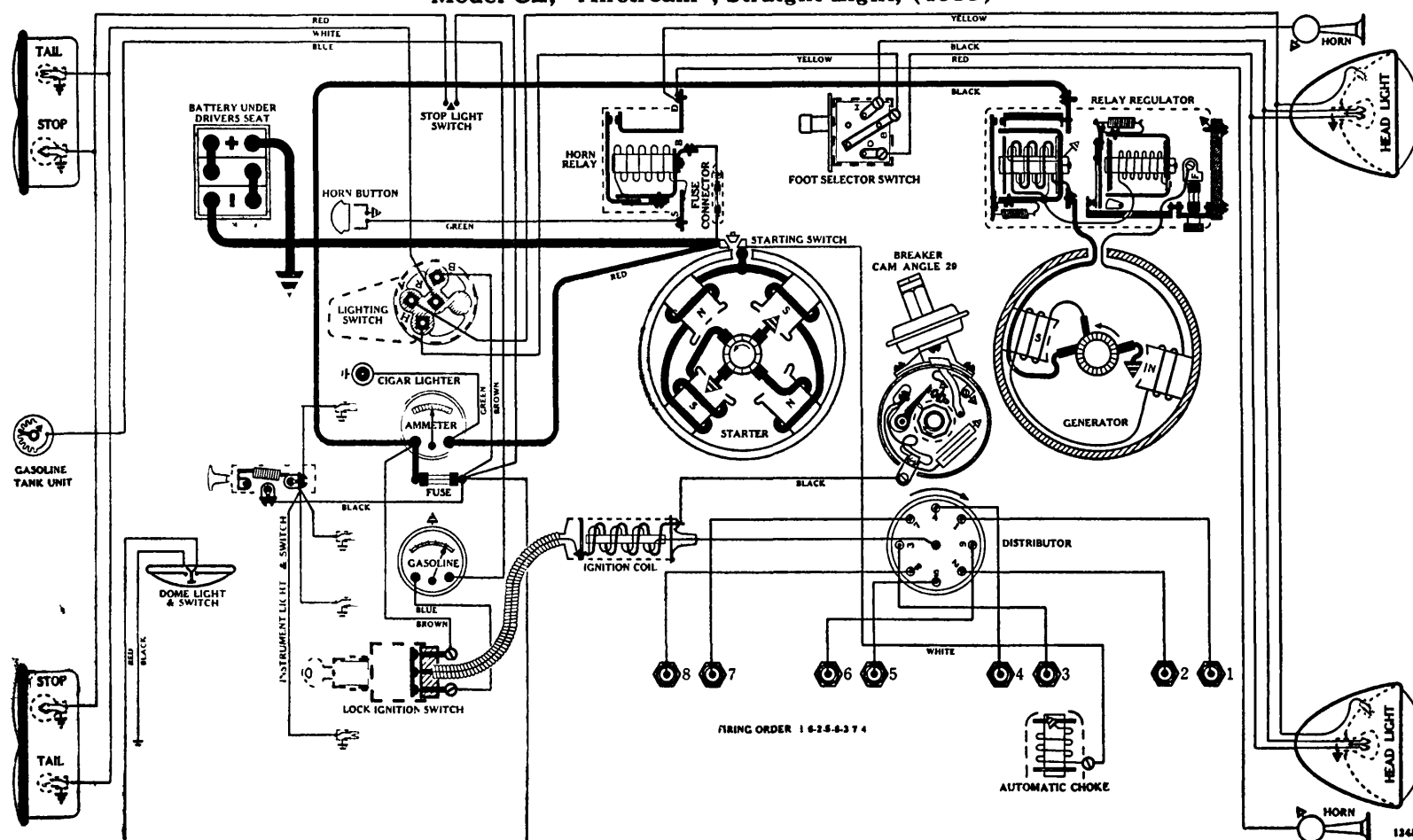
Horn Relay (if used)—Delco-Remy, 266-TK.

Foot Selector Switch—Clum No. 9579.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; INSTRUMENT—63; DOME—87; IGN. SWITCH LIGHT—55; STOP AND TAIL—1158.

CHRYSLER

Model CZ, "Airstream", Straight Eight, (1935)



BATTERY

Willard, WH-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—140 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—4.3.
Lighting Capacity—5.9 amps. for 20 hours (119 amp. hour).
Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAX-4002, MAX-4004

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.
Starter Pinion & Clutch Assembly—Auto-Lite, MAD-3099.
Running Free—65 amps. at 5½ volts, 5300 R.P.M.
Cranking Engine—200 amps. at 5 volts.
Lock Torque—16½ pound-feet, 640 amps. at 3 volts.
Brush Spring Tension—31 to 42 oz. on each (new brushes).
Starting Switch—Auto-Lite, SW-2813.
Armature—Auto-Lite, MAW-2030 on both.

IGNITION

A-L Test No. 424 Rotation, R. H., Top View
 Auto-Lite, IGT-4001

(Full Automatic Spark Advance in conjunction with Auto-Lite IGT-1023-AS Vacuum Advance Unit, which controls position of Breaker Plate.)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 29 degrees; open 16 degrees.

Contact Spring Tension—18 to 20 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "zero" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) is directly under pointer on gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-9); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance—7 degrees (Distributor). Starts with vacuum of from 4 to 5 inches of mercury. Requires vacuum of 12 inches for full travel.

Automatic Advance—13 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
700	350	Start
800 (Intermediate)	400	3
1800	900	7
2800	1400	11
3300 (Max.)	1650	13

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CE-4603 (Coupe); A-L, CE-4604 (Sedan).

Ign. Coil Only—A-L, CE-3033-AS (Coupe); A-L, CE-3224-S (Sedan).

Ign. Switch & Cable Assembly Less Lock—A-L, CE-1187-US (Coupe); A-L, CE-1187-ZS (Sedan).

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4608-A-5 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	12	1275	7.4
4	875	6.8	16	1600	7.8
8	1075	7.	21	2400 (Max.)	8.1

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.

Field Fuse—5 amp. (type 1A-5) in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116-F.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4301-A

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.5 to 7.3 volts.

Opens—0 to 3 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

Regulator—

Contact Spring Tension—10 to 12 oz.

Points Open—8.3 volts.

Points Close—7.2 volts.

Contact Opening—.005 inch (minimum).

Core Gap—.020 inch (contacts closed).

LIGHTING

Switch—Douglas, No. 5374.

Location—Behind instrument board.

Fuses—(Lighting) Single 20 amp. fuse (type 3A-20), mounted on back of ammeter. (If dual horns), 20 amp. (type 3A-20) in fuse connector on wire close to starting motor.

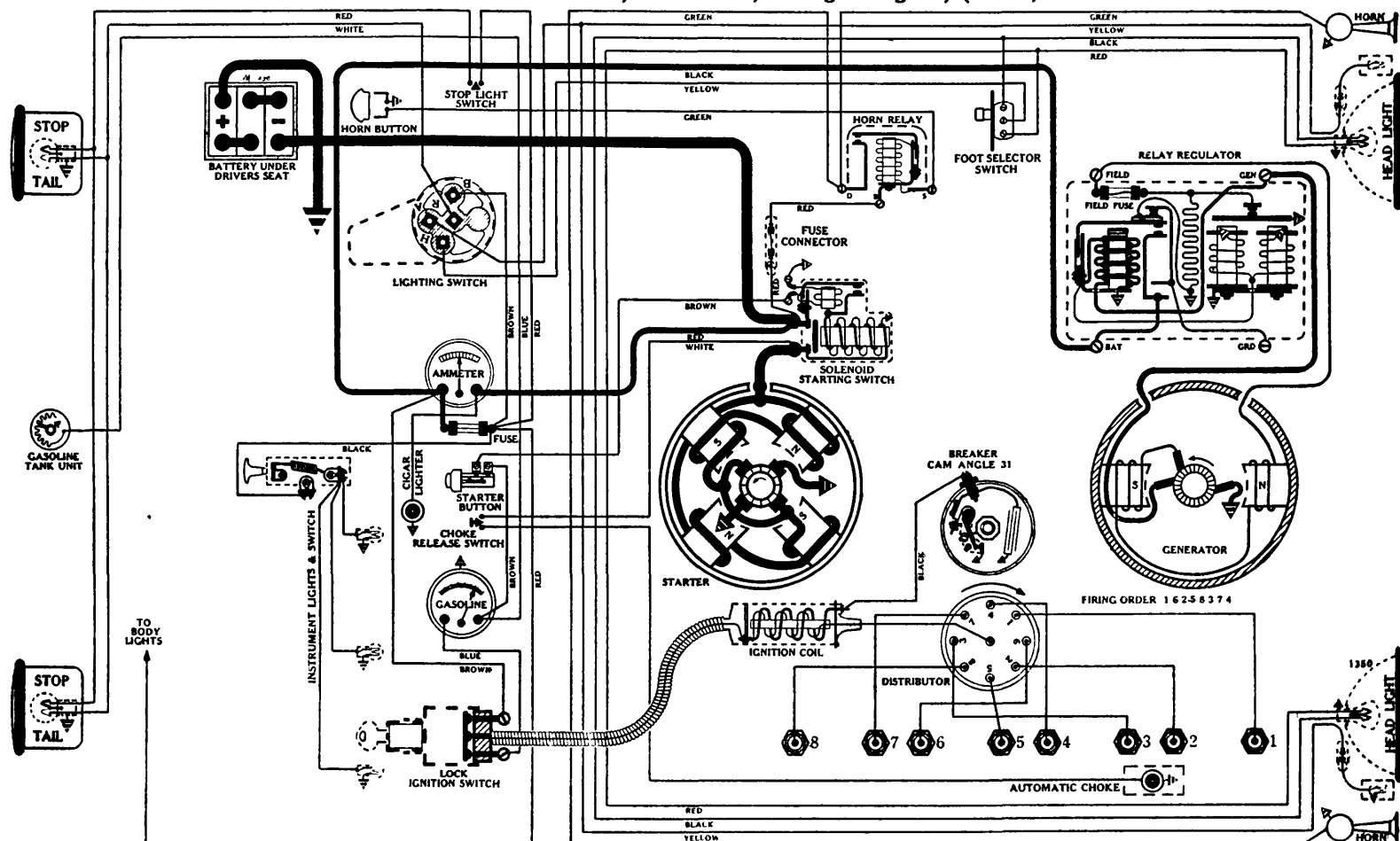
Horn Relay (if used)—Delco-Remy, 266-TK.

Foot Selector Switch—Clum No. 9579.

Lamps—Refer to "Lamp Data" in Technical Section. **HEAD**—2320; **PARK**—55; **INSTRUMENT**—63; **DOME**—87; **IGN. SWITCH LIGHT**—55; **STOP**—87; **TAIL**—63.

CHRYSLER

Models C-2 and C-3, "Airflow", Straight Eights, (1935)



BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded

Starting Capacity—160 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—5.4.
Lighting Capacity—6.8 amps. for 20 hours (136 amp. hour).
Box—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

GENERATOR

D-R Test No. 1250 Rotation, L. H., Com. End

Delco-Remy, 935-G, (Belt Drive)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	12	1250	7.5
4	875	6.9	16	1600	7.9
8	1000	7.2	20	2400 (Max.)	8.2

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5 volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Field Fuse—6 amp. (type 3A-6) in regulator box.

Brush Spring Tension—22 to 26 oz. on main; 16 to 20 oz. on third (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen cover band. Loosen third brush adjustment lock screw on outside of commutator end frame. Shift third brush by hand. Relock.

RELAY-REGULATOR

D-R Test No. 1242

Delco-Remy, 5544

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.4 to 6.8 volts.

Opens—0 to 3 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

Regulator—**Contact Spring Tension**—.7 to .9 oz. (measured at contact).

Air Gap—.028 to .040 inch (armature pressed down against lower stop).

Contact Opening—.008 to .013 inches (armature pressed down against lower stop).

Armature Travel—.028 to .040 inch (armature released).

Points Open—8.35 to 8.65 volts (70° F.).

Points Close—7.3 to 7.7 volts (70° F.).

Solenoid Relay (Located in Solenoid Unit):

Closes—3.6 to 4 volts (max.).

Opens—1.6 to 2. volts.

Contact Gap—.030 to .045 inch.

Core Gap—.010 to .014 inch, contacts closed.

STARTER

D-R Test No. 395

Rotation, L. H., Com. End

Delco-Remy, 727-J

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board, working in conjunction with a remote control relay (located in solenoid unit), the control relay being grounded by a short wire connected to frame of starting motor.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—165 to 190 amps. at 5.1 volts.

Lock Torque—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1516.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test No. 1020

Rotation, R. H., Top View

Delco-Remy, 665-B

(Full Automatic Spark Advance)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "zero" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) has moved 5 graduations past the pointer on gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-9); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
380	190	Start
500	250	2
800 (Intermediate)	400	7
2600	1300	13
3200 (Max.)	1600	15

Ignition Coil—Delco-Remy, 540-F.

Ignition Switch and Cable—Delco-Remy, 432-F.

LIGHTING

Switch—Douglas, No. 5394.

Location—Behind instrument board.

Fuses—(Lighting) Single 20 amp. fuse (typ 3A-20) mounted n back of ammeter. (Horn) 20 amp. (type 3A-20) in fuse connector on wire close to starting motor.

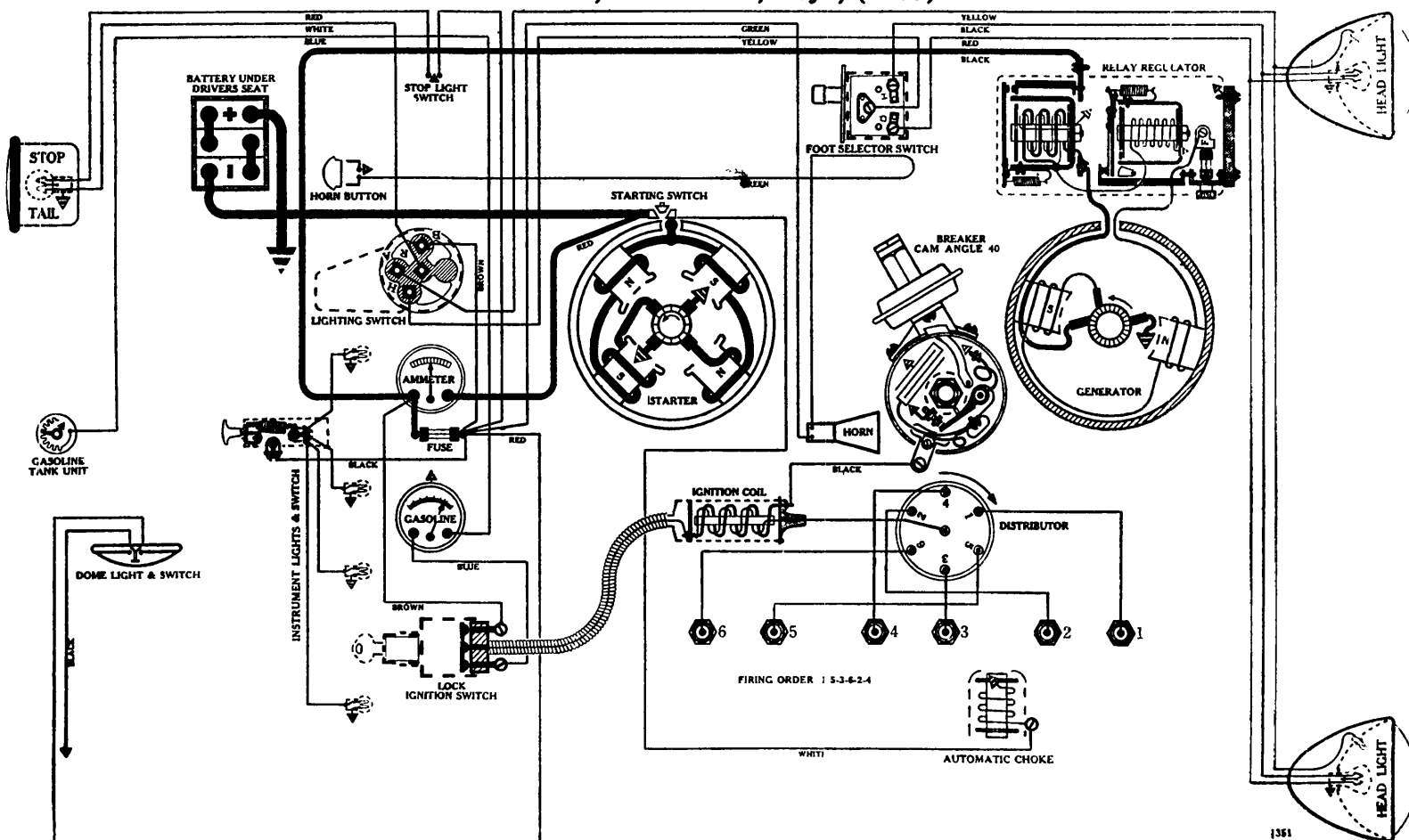
Horn Relay—Delco-Remy, 266-TK.

Foot Selector Switch—Delco-Remy, 465-S.

Lamps—Refer to "Lamp Data" in Technical Section. **HEAD**—2320; **PARK**—55; **INSTRUMENT**—63; **READING**—87; **IGN. SWITCH LIGHT**—55; **CAB LIGHT**—87; **DOME**—87; **STOP AND TAIL**—1158.

DE SOTO

Model SF, "Airstream", 6 cyl., (1935)



BATTERY

Willard, WH-2-15, 6 volts. Positive Terminal Grounded

Starting Capacity—140 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—4.3.

Lighting Capacity—5.9 amps. for 20 hours (119 amp. hour).

Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAX-4002

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion & Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5½ volts, 5300 R.P.M.

Cranking Engine—200 amps. at 5 volts.

Lock Torque—16½ pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—31 to 42 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-2813.

Armature—Auto-Lite, MAW-2030.

IGNITION

A-L Test No. 423 Rotation, R. H., Top View
Auto-Lite, IGS-4001

(Full Automatic Spark Advance in conjunction with Auto-Lite IGS-1023-S Vacuum Advance Unit, which controls position of Breaker Plate.)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 40 degrees; open 20 degrees.

Contact Spring Tension—17 to 19 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke.

Stop when the "zero" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) is directly under pointer on gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-9); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance—9 degrees (Distributor). Starts with vacuum of from 4 to 5 inches of mercury. Requires vacuum of 12 inches for full travel.

Automatic Advance—12 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
700	350		
800 (Intermediate)	400		3
1440	720		6
2280	1140		10
2700 (Max.)	1350		12

Ign. Coil, Lock Switch & Cable Assembly Complete—A-L, IG-4615.

Ign. Coil Only—A-L, IG-3224-S.

Ign. Switch & Cable Assembly Less Lock—A-L, CE-1187-ABS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4608-5, (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	12	1275	7.4
4	875	6.8	16	1600	7.8
8	1075	7.	21	2400 (Max.)	8.1

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.

Field Fuse—5 amp. (type 1A-5) in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116-F.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4301-A

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.5 to 7.3 volts (hot or cold).

Opens—0 to 3 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

Regulator—

Contact Spring Tension—10 to 12 oz.

Points Open—8.3 volts.

Points Close—7.2 volts.

Contact Opening—.005 inch (minimum).

Core Gap—.020 inch (contacts closed).

LIGHTING

Switch—Douglas, No. 5374.

Location—Behind instrument board.

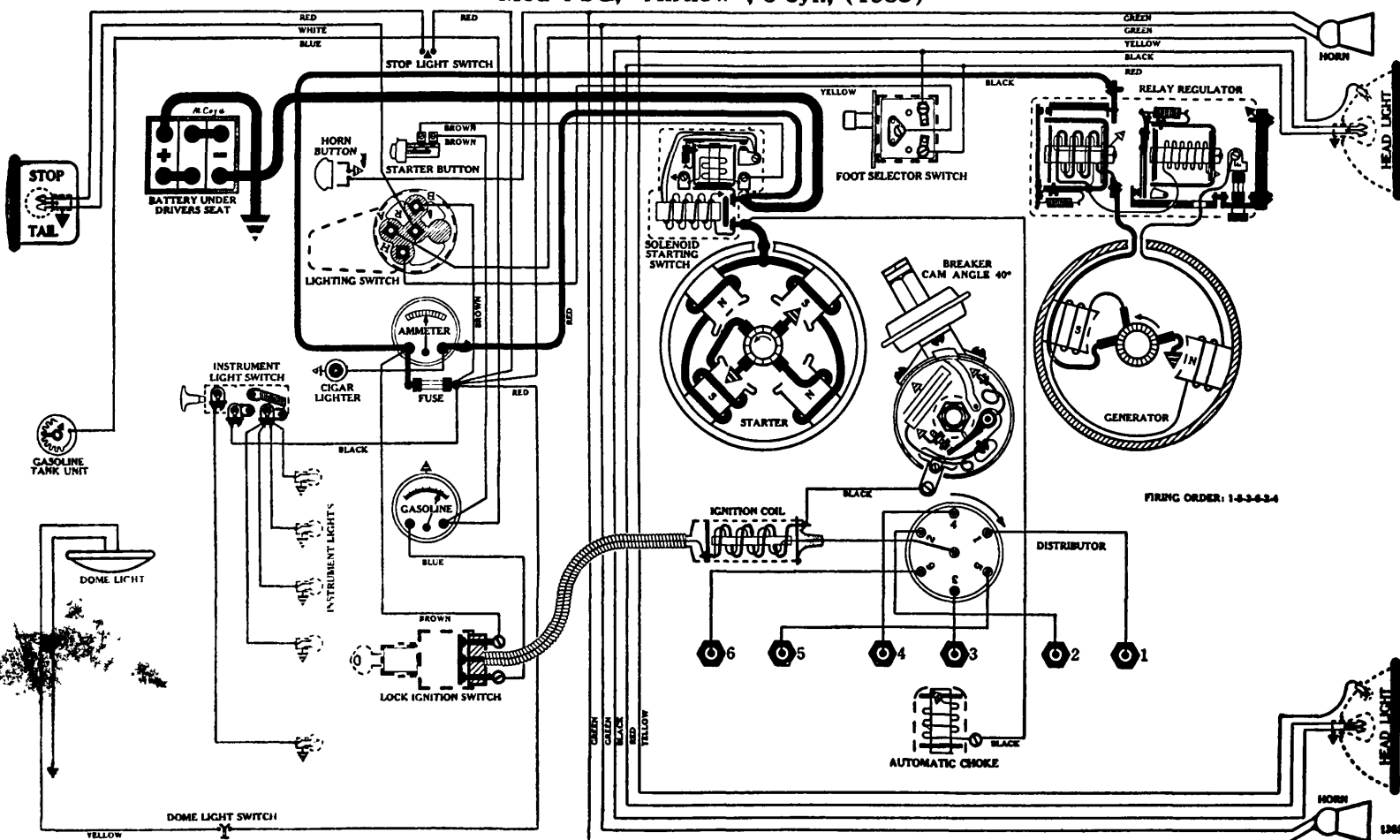
Fuses—(Lighting) Single 20 amp. fuse (type 3A-20), mounted on back of ammeter. (If dual horns), 20 amp. (type 3A-20) in fuse connector on wire close to starting motor.

Foot Selector Switch—Clum, No. 9579.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; INSTRUMENT—63; DOME—87; IGN. SWITCH LIGHT—55; SPEEDOMETER LIGHTS—63; STOP AND TAIL—1158.

DE SOTO

Mod 1 SG, "Airflow", 6 cyl., (1935)

**BATTERY**

Willard, WH-2-15, 6 volts. Positive Terminal Grounded
 Starting Capacity—140 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—4.3.
 Lighting Capacity—5.9 amps. for 20 hours (119 amp. hour).
 Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAX-4003

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board, working in conjunction with a remote control relay (located in solenoid unit). One terminal of control relay is grounded thru its case.

Starter Pinion & Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5.5 volts, 5300 R.P.M.

Cranking Engine—200 amps. at 5.1 volts.

Lock Torque—16½ pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—31 to 42 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4101.

Armature—Auto-Lite, MAW-2030.

IGNITION

A-L Test No. 423 Rotation, R. H., Top View
 Auto-Lite, IGS-4001

(Full Automatic Spark Advance in conjunction with Auto-Lite IGS-1023-S Vacuum Advance Unit, which controls position of Breaker Plate.)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 40 degrees; open 20 degrees.

Contact Spring Tension—17 to 19 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "zero" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) has moved 5 graduations past the pointer on gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-9); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance—9 degrees (Distributor). Starts with vacuum of from 4 to 5 inches of mercury. Requires vacuum of 12 inches for full travel.

Automatic Advance—12 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
700	350	Start
800 (Intermediate)	400	3
1440	720	6
2280	1140	10
2700 (Max.)	1350	12

Ign. Coil, Lock Switch & Cable Assemblies Complete—A-L, IG-4614-A and IG-4614.

Ign. Coil Only—A-L, IG-3224-S on both.

Ign. Switch & Cable Assembly Less Lock—CE-1187-YS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4608-5, (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	12	1275	7.4
4	875	6.8	16	1600	7.8
8	1075	7.	21	2400 (Max.)	8.1

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.

Field Fuse—5 amp. (type 1A-5) in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116-F.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4301-A

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.5 to 7.3 volts (hot or cold).

Opens—0 to 3 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

Regulator—

Contact Spring Tension—10 to 12 oz.

Points Open—8.3 volts.

Points Close—7.2 volts.

Contact Opening—.005 inch (minimum).

Core Gap—.020 inch (contacts closed).

Solenoid Relay

(Located in Solenoid Unit):

Closes—3.2 to 3.6 volts (max.).

Opens—2.0 volts or less.

Contact Gap—.025 to .030 inch.

Core Gap—.005 to .007 inch, contacts closed.

LIGHTING

Switch—Douglas, No. 5394.

Location—Behind instrument board.

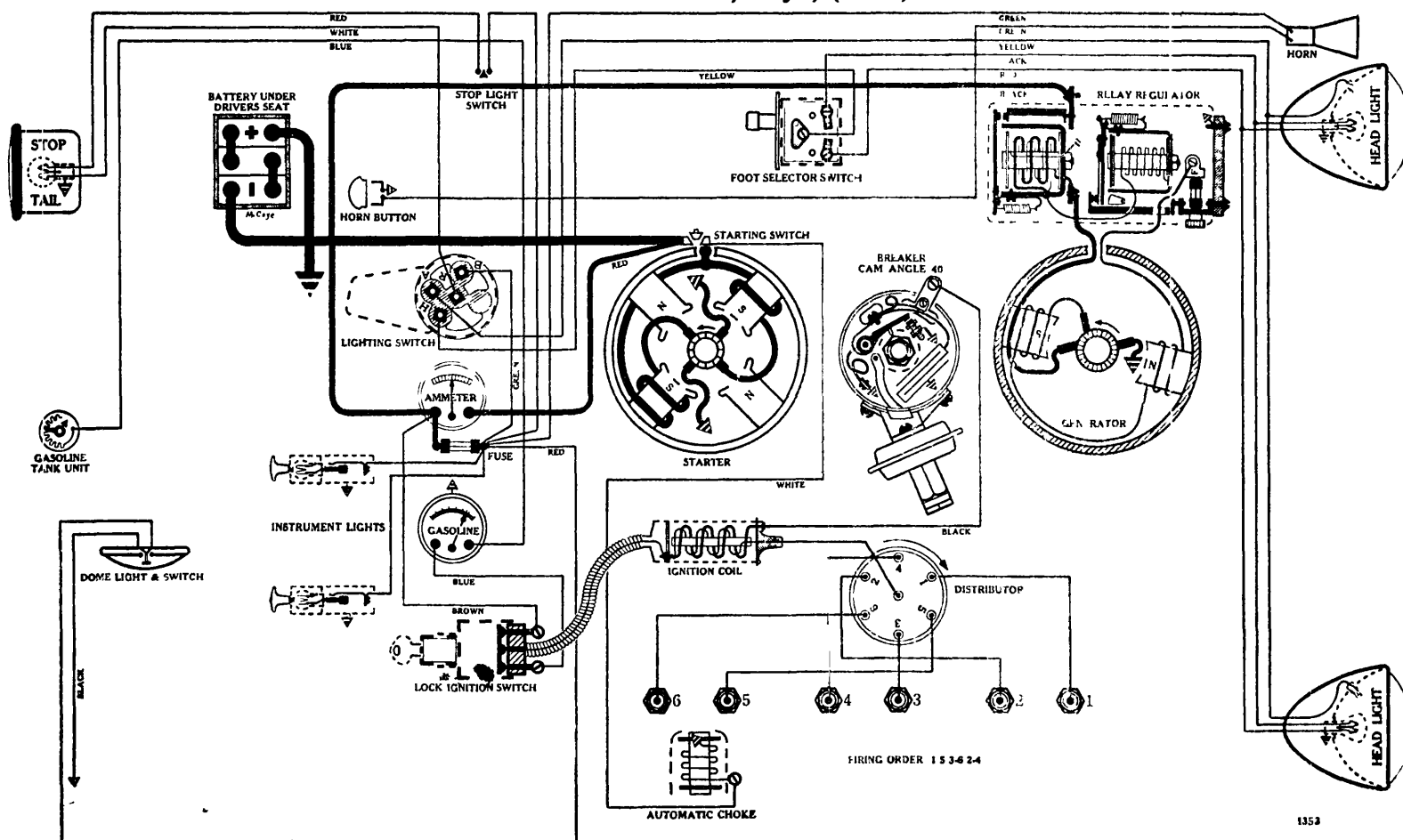
Fuse—Single 20 amp. fuse (type 3A-20), mounted on back of ammeter.

Foot Selector Switch—Clum No. 9590.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—63; DIRECT DASH LIGHT—63; SPEEDOMETER LIGHTS—55; INSTRUMENT—55; READING—87; STOP AND TAIL—1158.

DODGE

Mod ls DU and DV, 6 cyl., (1935)



BATTERY

Willard, WT-1-15, 6 volts. Positive Terminal Grounded

Starting Capacity—117 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.

Lighting Capacity—4.5 amps. for 20 hours (90 amp. hour).

Box—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite, MAW-4002, MAW-4003

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion & Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5½ volts, 4900 R.P.M.

Cranking Engine—180 amps. at 5 volts.

Lock Torque—12 pound-feet, 505 amps. at 3 volts.

Brush Spring Tension—31 to 42 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-2677-A (MAW-4002). Auto-Lite, SW-2813 (MAW-4003).

Armature—Auto-Lite, MAW-2030.

IGNITION

Rotation, R. H., Top View

A-L Test No. 419 Auto-Lite, IGS-4002 (Model DU)

A-L Test No. 418 Auto-Lite, IGS-4003 (Model DV)

(Full Automatic Spark Advance in conjunction with Auto-Lite IGS-1023-S Vacuum Advance Unit, which controls position of Breaker Plate.)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 40 degrees; open 20 degrees.

Contact Spring Tension—17 to 19 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke.

Stop when the "zero" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) has moved 4 graduations past the pointer on gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-9); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance—9 degrees (Distributor). Starts with vacuum of from 4 to 5 inches of mercury. Requires vacuum of 12 inches for full travel.

Automatic Advance—12 degrees (Distributor).

NOTE:—For automatic spark advance characteristics of IGS-4003 Distributor see Plymouth 1935.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
700	350	Start
800 (Intermediate)	400	3
1800	900	7
2300	1150	9
3060 (Max.)	1530	12

Ign. Coil, Lock Switch & Cable Assembly Complete—A-L, IG-4609 (Coupe); IG-4613 (Sedan).

Ign. Coil Only—A-L, IG-3224-S on both.

Ign. Switch & Cable Assembly Less Lock—A-L, CE-1187-RS (Coupe); CE-1187-XS (Sedan).

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4608-5 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	12	1275	7.4
4	875	6.8	16	1600	7.8
8	1075	7.	21	2400 (Max.)	8.1

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.

Field Fuse—5 amp. (type 1A-5) in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116-F.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4301-A

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.5 to 7.3 volts.

Opens—0 to 3 amps. discharge.

Core Gap—.010 to .030 inch, contacts closed.

Regulator—

Contact Spring Tension—10 to 12 oz.

Points Open—8.3 volts.

Points Close—7.2 volts.

Contact Opening—.005 inch (minimum).

Core Gap—.020 inch (contacts closed).

LIGHTING

Switch—Douglas, No. 5394.

Location—Behind instrument board.

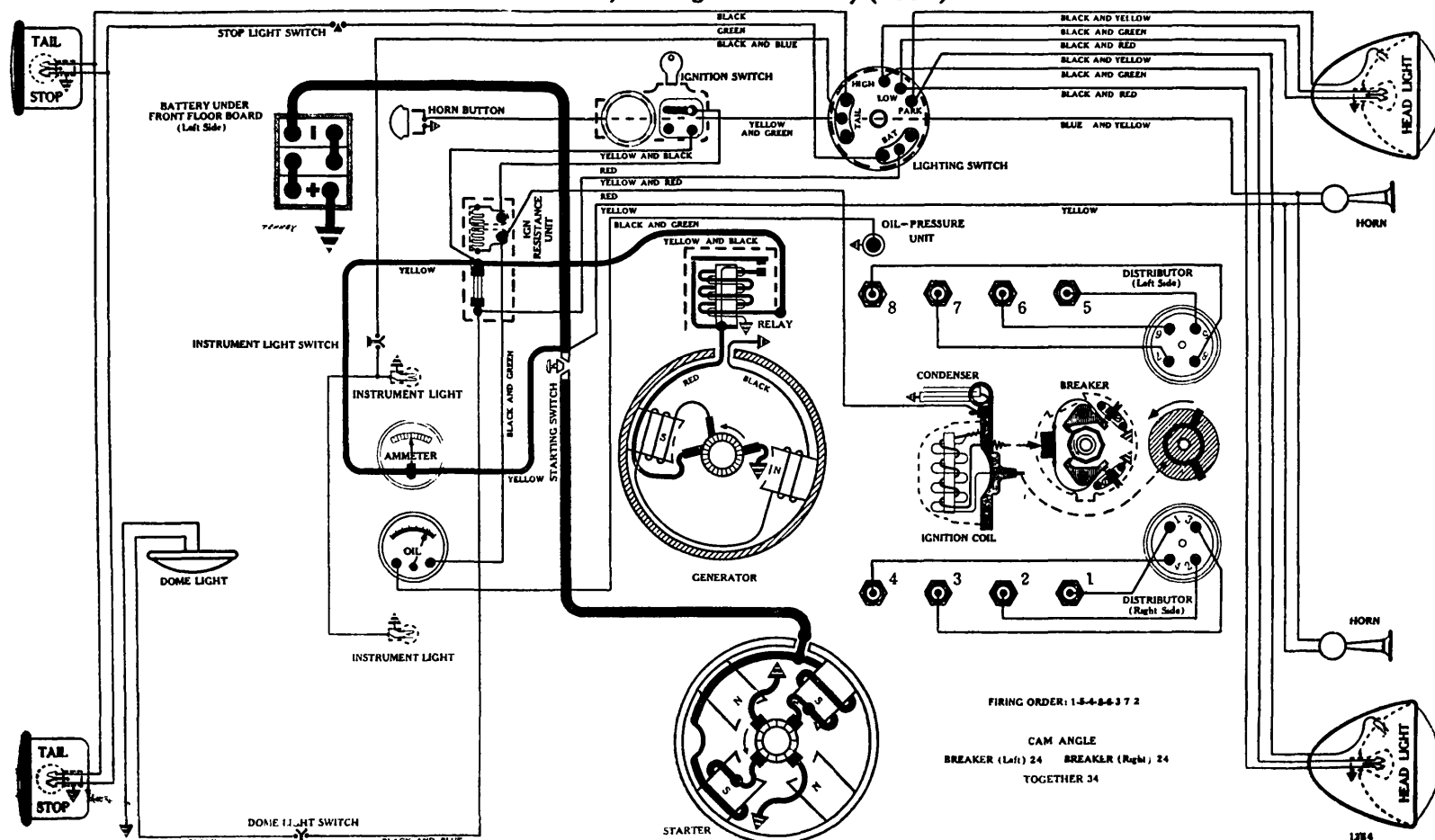
Fuses—(Lighting) Single 20 amps. fuse (type 3A-20), mounted on back of ammeter. (If dual horns), 20 amp. (type 3A-20) in fuse connector on wire close to starting motor.

Foot Selector Switch—Clum No. 9579 or Delco-Remy 465-Z.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; INSTRUMENT—55; DOME—87; STOP AND TAIL—1158.

FORD

Model 48, 90 degre "Ve" 8, (1935)



BATTERY

Ford, 40-10655-C, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.5.

Lighting Capacity—4.8 amps. for 20 hours (96 amp. hour).

Box—Length, 10-9/16; width, 7 1/4; height, 7 1/4 inches.

STARTER

Rotation, L. H., Com. End

Ford, Type 18-11002

Connection to Engine—Bendix Drive, Type L11FX-10.

Running Free—35 to 40 amps. at 6 volts, 3960 R.P.M.

Cranking Engine—210 to 225 amps. at 4.9 volts.

Lock Torque—12 pound-feet, 500 amps. at 3 volts.

Brush Spring Tension—32 to 36 oz. on each (new brushes).

Starting Switch—Ford, 18-11450.

Armature—Ford, 18-11005.

IGNITION

Rotation, L. H., Viewed from Front

Special Ford, employing Mallory Breaker Principle

Full Automatic Spark Advance in conjunction with Vacuum Operated Governor Brake

Breakers—Contact separation .012 to .014 inch.

Cam Angles—Points closed 24 degrees; open 21 degrees (left breaker). Points closed 24 degrees; open 21 degrees (right breaker). Points closed 34 degrees; open 11 degrees (both operating).

Contact Spring Tension—22 to 27 oz. on each.

Timing—Construction of ignition drive assembly makes it impossible to attach unit to engine other than in correct position. Provision is made for a slight variation in spark timing by moving small 3/16 inch slotted cap screw (found on right side of ignition housing between mounting flange and right distributor cap) up, to increase spark advance, and down to retard. With screw in center of slot engine will have an initial spark advance of 4 flywheel degrees which, theoretically, is the correct timing position.

Spark Plugs—18-MM (Champion type 7); Gap .025 inch.

Firing Order—1-5-4-8-6-3-7-2.

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist.)
(Tests to be made with Governor free—Vacuum Brake Released)

400	200	2
650	325	4
1180	590	6
2100	1050	8
3000 (Max.)	1500	10

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301167.

Ignition Lock Number—000 to 999.

Ignition Key Series—F.D.

Ignition Key Blank Number—Hurd 9020.

GENERATOR

Rotation, L. H., Com. End

Ford, Type 40-10000-B (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.7	9	1100	7.5
3	800	6.9	10	1200	7.6
5	900	7.3	11	1500 (Max.)	7.9
7	1000	7.4	10 1/2	1700	7.9

Motoring Freely—6 amps. at 6 volts.

Max. Stall Current—25 amps. at 5 volts.

Field Test—5 1/4 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on main; 20 to 24 oz. on third.

Armature—Ford, 18-10005-A.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Ford, Type B-10505-A

Closes—6 1/2 to 7 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .020 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Ford, Type 48-11653.

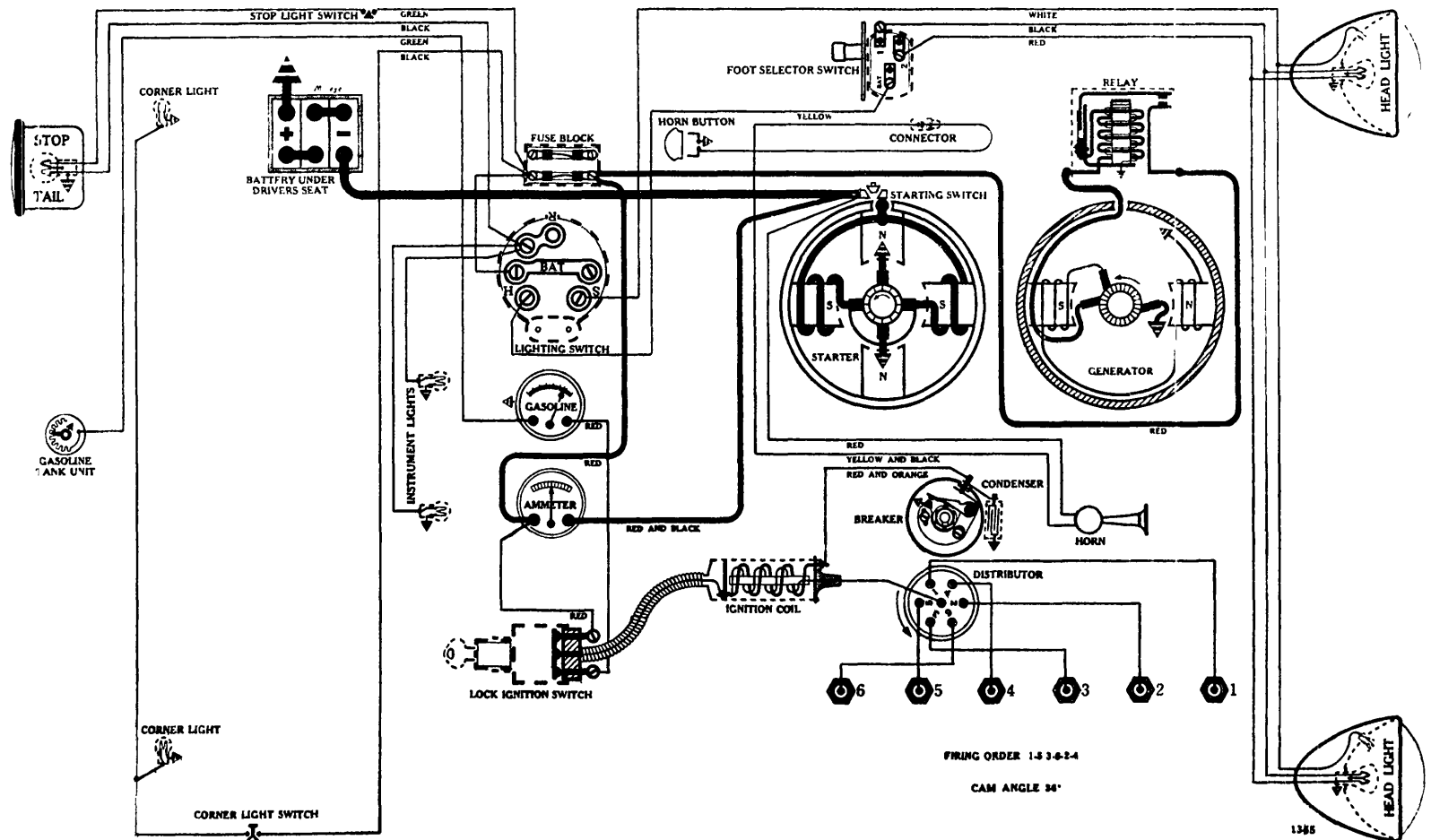
Location—Foot of steering column. Lights controlled by lever on steering wheel. Wires soldered to terminals.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on dash, behind instrument board.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

GRAHAM

Model 74, Special Six, 6 cyl., (1935)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded
Starting Capacity—105 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—2.3.
Lighting Capacity—4.3 amps. for 20 hours (86 amp. hour).
Box—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

D-R Test No. 368 Rotation, L. H., Com. End
Delco-Remy, 738-J

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—160 to 185 amps. at 5.2 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test No. 1076 Rotation, L. H., Top View
Delco-Remy, 622-Z

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-N Vacuum Control.)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 36 degrees; open 24 degrees.

Contact Spring Tension—17 to 21 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. On engines with aluminum heads stop when second ignition mark (located 2 degrees or 3/16 inches before flywheel mark "DC-1") is directly under pointer in flywheel inspection hole. On engines with cast iron heads stop when first ignition mark (located 5 degrees or 1/2 inch before "DC-1") is under pointer.

NOTE:—Some flywheels have only one ignition mark to be used for timing aluminum head engines. In such cases a new mark should be cut 1/2 inch ahead of "DC-1" for timing engines with cast iron heads.

Spark Plugs—18-MM (Champion type 7); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance—5 to 6 degrees (Distributor). Starts with vacuum of 7 inches mercury. Requires vacuum of from 9 to 13 inches for full travel.

Automatic Advance—7 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
1000	500	2
1200 (Intermediate)	600	3
1900	950	5
2600 (Max.)	1300	7

Ignition Coil—Delco-Remy, 536-J.

Ignition Switch and Cable—Delco-Remy, 431-U.

GENERATOR

D-R Test No. 278-A Rotation, L. H., Com. End

Delco-Remy, 937-Y (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	10	1020	7.5
2	760	6.7	14	1270	7.9
6	860	7.1	18	2000 (Max.)	8.3

Motoring Freely—3 1/2 to 4 amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 6 volts.

Field Test—3 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—23 to 27 oz. on each (new brushes).

Armature—Delco-Remy, 1859794.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAY

Delco-Remy, 265-B

Closes—6 3/4 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-P.

Location—Behind instrument board (left side).

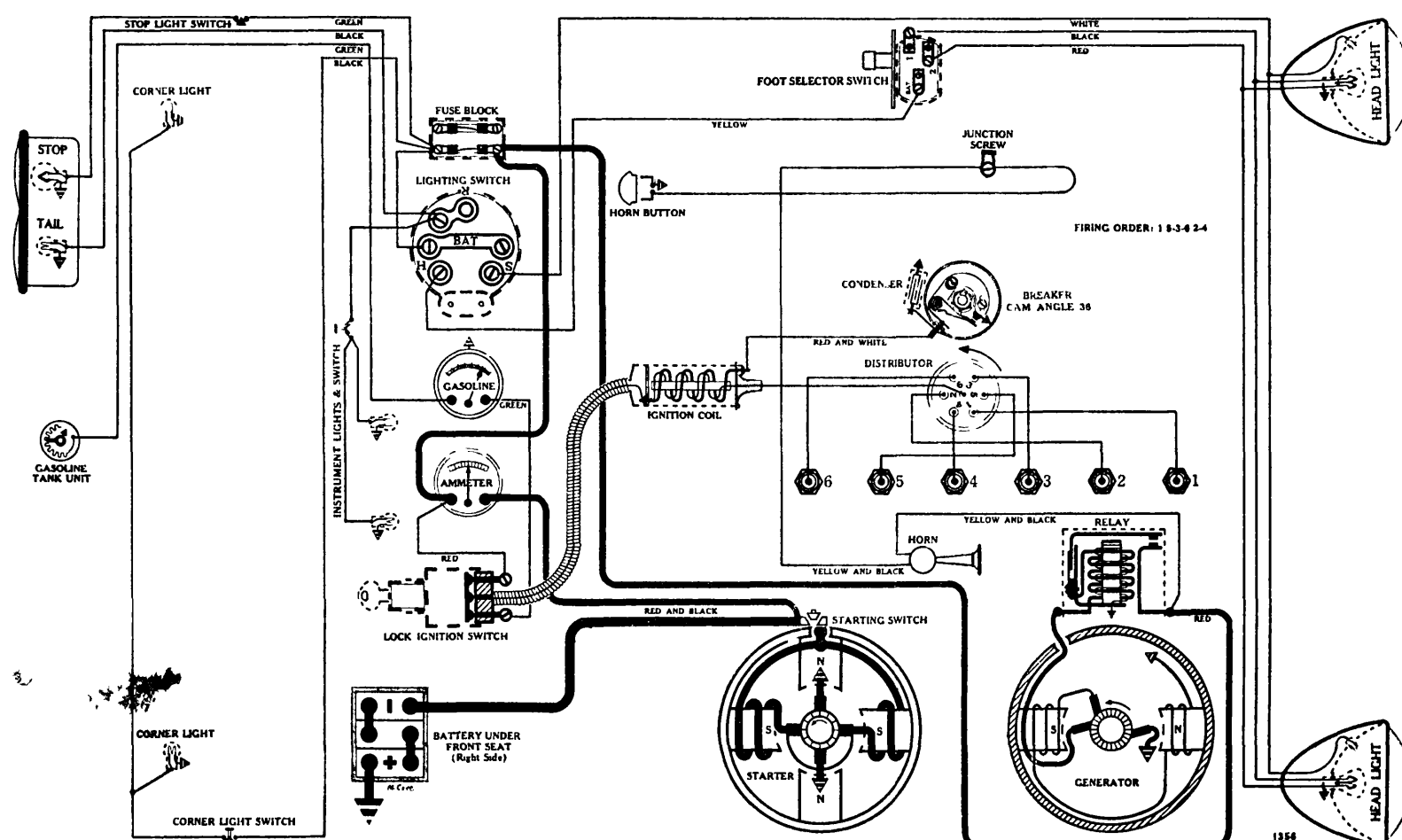
Fuses—Two 20 amp. fuses (type 3A-20) in fuse block on dash (driver's side).

Foot Selector Switch—Delco-Remy, 465-V.

Lamps—Refer to "Lamp Data" in technical section. HEAD—2320; PARK—55; INSTRUMENT—51; CORNER—63; STOP AND TAIL—1158.

GRAHAM

Model 73, Standard Six, 6 cyl., (1935)



BATTERY

Willard, WH-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1.
Lighting Capacity—5.1 amps. for 20 hours (102 amp. hour).
Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

D-R Test No. 368 Rotation, L. H., Com. End
Delco-Remy, 738-D

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—160 to 185 amps. at 5.2 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test No. 997 Rotation, L. H., Top View
Delco-Remy, 632-Z

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 36 degrees; open 24 degrees.

Contact Spring Tension—17 to 21 oz.

Timing—With No. 1 piston on compression stroke bring flywheel mark "SA-1" (which mark is 3 degrees or 5/16 inch on flywheel before T.D.C.) directly under pointer in flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type 7); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—10½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
700	350		3
1600	800		5
2220	1110		9
3440	1720		10½
3900 (Max.)	1950		

Ignition Coil—Delco-Remy, 536-J.

Ignition Switch and Cable—Delco-Remy, 431-U.

GENERATOR

D-R Test No. 1243 Rotation, L. H., Com. End

Delco-Remy, 936-D (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.5	12	1200	7.5
4	800	6.8	18	1800	8.
8	960	7.1	20	2400 (Max.)	8.2

Motoring Freely—3½ amps. at 6 volts.

Max. Stall Current—25 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAY

Delco-Remy, 265-H

Closes—6¼ to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-P.

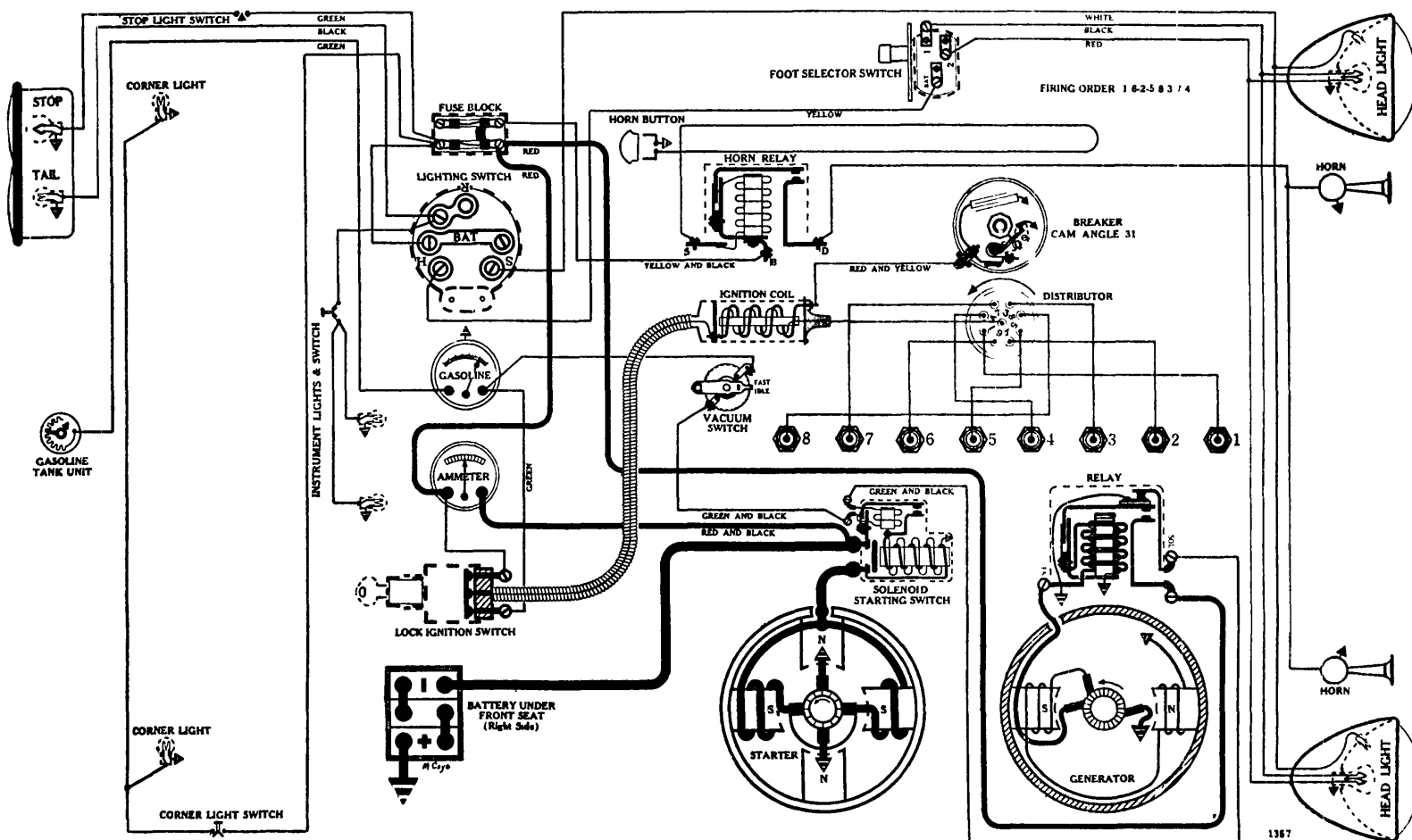
Location—Behind instrument board (left side).

Fuses—Two 20 amp. fuses (type 3A-20) in fuse block on dash (driver's side).

Foot Selector Switch—Delco-Remy, 465-V.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; INSTRUMENT—51; CORNER—63; STOP—87; TAIL—63.

Model 72, Standard Straight Eight, (1935)



Willard, WS-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—122 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.3.
Lighting Capacity—5 amps. for 20 hours (100 amp. hour).
Box—Length, 10-5/16; width, 7-1/16; height, 8-13/16 inches.

D-R Test No. 402 **Rotation, L. H., Com. End**
Delco-Remy, 734-U

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch, remote control relay (located in solenoid unit), and an auxiliary set of grounding points found on cut out relay.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—175 to 190 amps. at 5.1 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1517.

Vacuum Starting Control Switch—Delco-Remy, 1600.

Armature—Delco-Remy, 823881.

D-R Test No. 987 **Rotation, L. H., Top View**
Delco-Remy, 661-X

(Full Automatic Spark Advance in conjunction with Delco-Remy
680-N Vacuum Control.)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—With No. 1 piston on compression stroke bring flywheel mark "SA-1" (found 3 degrees or 5/16 inch ahead of flywheel mark "T.D.C.") opposite pointer on flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type 7); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance—5 to 6 degrees (Distributor) Starts with vacuum of 7 inches mercury Requires vacuum of from 9 to 13 inches for full travel.

Automatic Advance—8½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
1000	500	1
1800	900	3
3060	1530	6
4100 (Max.)	2050	8½

Ignition Coil—Delco-Remy, 536-J.

Ignition Switch and Cable—Delco-Remy, 431-U.

D-R Test No. 1243 Rotation, L. H., Com. End

Delco-Remy, 936-F (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.5	12	1200	7.5
4	800	6.8	18	1800	8.
8	960	7.1	20	2400 (Max.)	8.2

Motoring Freely—3½ amps. at 6 volts.

Max. Stall Current—25 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator, end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

Delco-Remy, 265-S

Cut-Out Relay—Closes—6½ to 7½ volts.
Opens—0 to 2½ amps. discharge.
Contact Gap—.015 to .025 inch.
Core Gap—.012 to .017 inch, contact

Solenoid Relay (Located in Solenoid Unit):
Closes—3.6 to 4 volts (max.).
Opens—1.6 to 2 volts.
Contact Gap—.030 to .045 inch.
Core Gap—.010 to .014 inch, contacts closed.

Switch—Delco-Remy, 478-P.

Location—Behind instrument board (left side).

Fuses—Two 20 amp. fuses (type 3A-20) in fuse block on dash (driver's side).

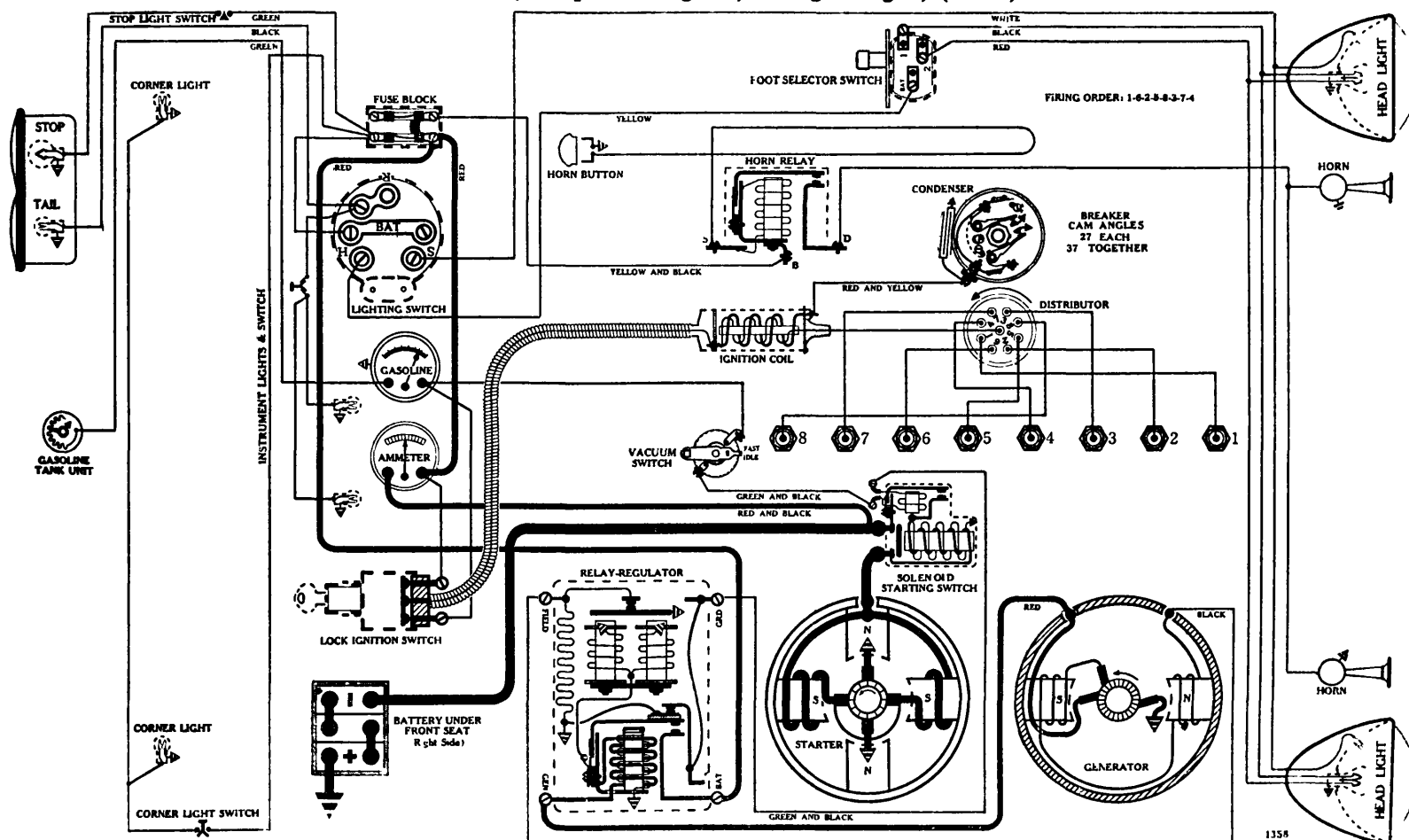
Horn Relay—Delco-Remy, 266-TK.

Foot Selector Switch—Delco-Remy, 465-V.

Lamps—Refer to "Lamp Data" in Technical Section. **HEAD**—2320; **PARK**—55; **INSTRUMENT**—51; **CORNER**—63; **STOP**—87; **TAIL**—63.

GRAHAM

Model 75, "Super-Charged", Straight Eight, (1935)



BATTERY

Willard, WH-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—140 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—4.3.
Lighting Capacity—5.9 amps. for 20 hours (119 amp. hour).
Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

D-R Test No. 402

STARTER

Rotation, L. H., Com. End Delco-Remy, 734-U
Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch, remote control relay (located in solenoid unit), and an auxiliary set of grounding points found on cut-out relay.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—175 to 190 amps. at 5.1 volts.

Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1517.

Vacuum Starting Control Switch—Delco-Remy, 1600.

Armature—Delco-Remy, 823881.

D-R Test No. 1048

IGNITION

Rotation, L. H., Top View Delco-Remy, 661-Y
(Full Automatic Spark Advance in conjunction with Delco-Remy 680-P Vacuum Control.)

IMPORTANT NOTE! The 661-Y Distributor employs an eight lobe cam with two sets of breaker points, which are connected in parallel, and control a single coil. The movable set of breaker points should be so located that they will open 10 degrees before the stationary set. Engine timing is done from the stationary set, which opens last. With this adjustment the period of coil saturation (cam angle) is increased from 27 degrees to 37 degrees.

Breakers—Contact separation .015 inch on each.

Cam Angles—Points closed 27 degrees; open 18 degrees (each breaker separately). Points closed 37 degrees; open 8 degrees (both operating).

Contact Spring Tension—19 to 23 oz. on each.

Timing—With No 1 piston on compression stroke bring flywheel mark "SA 1" (found 3 degrees ahead of flywheel mark "T.D.C.") opposite pointer on flywheel housing. With rotor under No 1 Dist Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—18-MM (Champion type 7); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance—5 to 6 degrees (Distributor) Starts with vacuum of from 10 to 11 inches of mercury. Requires vacuum of from 15 to 16 inches for full travel.

Automatic Advance—7½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
200	100	Start
880	440	2
2000 (Intermediate)	1000	5½
2600	1300	6
4000 (Max.)	2000	7½

Ignition Coil—Delco-Remy, 539-M.

Ignition Switch and Cable—Delco-Remy, 431-U.

D-R Test No. 1254

GENERATOR

Rotation, L. H., Com. End Delco-Remy, 936-G
Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.5	12	1300	7.6
4	860	6.8	16	1680	7.9
8	1040	7.2	22	2800 (Max.)	8.5

Motoring Freely—3½ to 4 amps. at 6 volts.

Max. Stall Current—23 to 26 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

D-R Test No. 1296

RELAY-REGULATOR

Delco-Remy, 5590

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.4 to 6.8 volts.

Opens—0 to 3 amps. discharge at 6.3 volts.

Contact Gap—.018 to .025 inch.

Core Gap—.018 to .022 inch, contacts closed.

Regulator—

Contact Spring Tension—.7 to .9 oz. (measured at contacts).

Air Gap—.028 to .040 inch (armature pressed down against lower stop).

Contact Opening—.008 to .013 inch (armature pressed down against lower stop).

Armature Travel—.028 to .040 inch (armature released).

Points Open—8.35 to 8.65 volts (70° F.).

Points Close—7.3 to 7.7 volts (70° F.).

Solenoid Relay

(Located in Solenoid Unit):

Closes—3.6 to 4 volts (max.).

Opens—1.6 to 2. volts.

Contact Gap—.030 to .045 inch.

Core Gap—.010 to .014 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 478-P.

Location—Behind instrument board (left side).

Fuses—Two 20 amp. fuses (type 3A-20) in fuse block on dash driver's side).

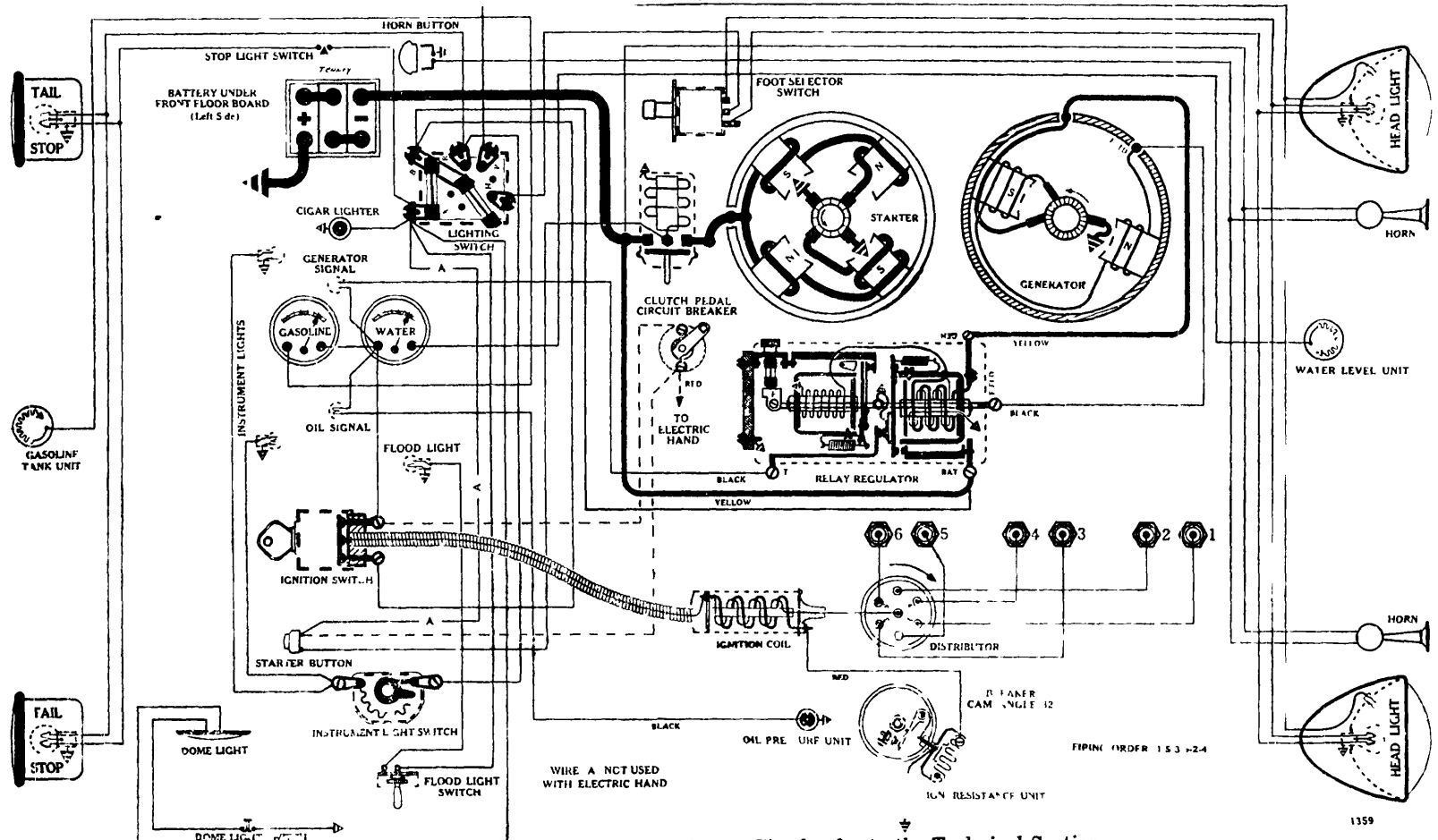
Horn Relay—Delco-Remy, 266-TK.

Foot Selector Switch—Delco-Remy, 465-V.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; INSTRUMENT—51; CORNER—63; STOP—87; TAIL—63.

HUDSON

Mod 135-GH, Big Six, (1935)



For complete information on the Electric Hand refer to the Technical Section.

BATTERY

National, ST3-17X, 6 volts. Positive Terminal Grounded
Starting Capacity—122 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—4.
Lighting Capacity—4.8 amps. for 20 hours (96 amp. hour).
Box—Length, 10-9/16; width, 7 1/4; height, 7-15/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4060

Connection to Engine—Bendix Drive, Type A-1588.
Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.
Cranking Engine—225 to 235 amps. at 5.1 volts.
Lock Torque—15 1/2 pound-feet, 582 amps. at 3 volts.
Brush Spring Tension—44 to 56 oz. on each (new brushes).
Solenoid Starting Switch—Auto-Lite, SS-4001.
Push Button Starting Control Switch—Soreng-Manegold, A-5550-A.
Armature—Auto-Lite, MAB-2114.

IGNITION

Rotation, R. H., Top View

Auto-Lite, IGB-4301-A (Engines 70000-73790), data as shown
Auto-Lite, IGB-4301-B (Engines 73791 and up). For Distributor characteristics see Terraplane, 6 cyl. DeLuxe, 1935 (Full Automatic Spark Advance on both)

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 32 degrees; open 28 degrees.
Contact Spring Tension—17 to 19 oz.
Timing—With No. 1 piston on compression stroke, slowly turn engine until flywheel mark "U.D.C. 1-6" is within 1/2 inch (or 4 1/2 degrees flywheel) of the pointer cast in flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open. The IGB-4301-B distributor should be timed to fire at exact T.D.C.
Spark Plugs—14-MM (Champion type J-7); Gap .020 to .025 inch.
Firing Order—1-5-3-6-2-4.
Automatic Advance—15 degrees (Distributor), IGB-4301-A.
Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist.)
800 400 Start
1440 720 3
2080 1040 6
3140 1570 11
4000 (Max.) 2000 15
Ign. Coil, Lock Switch & Cable Assembly Complete—A-L, IG-4616.
Ign. Coil Only—A-L, IG-3224-S.
Ign. Switch & Cable Assembly Less Lock—A-L, CE-2233-S.
Ignition Lock Number—Briggs & Stratton 50184.
Ignition Key Series—Briggs & Stratton H601-H1100.
Ignition Key Blank Number—Briggs & Stratton 42755.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GBK-4602-1 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	775	6.2	10	1175	7.1
2	850	6.3	12	1280	7.3
4	925	6.5	16	1450	7.6
6	975	6.7	18	1850	7.8
8	1085	7.	22	2400 (Max.)	8.3

Motoring Freely—5 amps. at 6 volts.
Max. Stall Current—25 to 28 amps. at 5 1/2 volts.
Field Test—3.9 amps. at 6 volts across field coils in series.
Field Fuse—7 1/2 amp. (type 1A-7 1/2) in regulator unit.
Brush Spring Tension—22 oz. Max. on each (new brushes).
Armature—Auto-Lite, GBK-2055.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4304-A

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

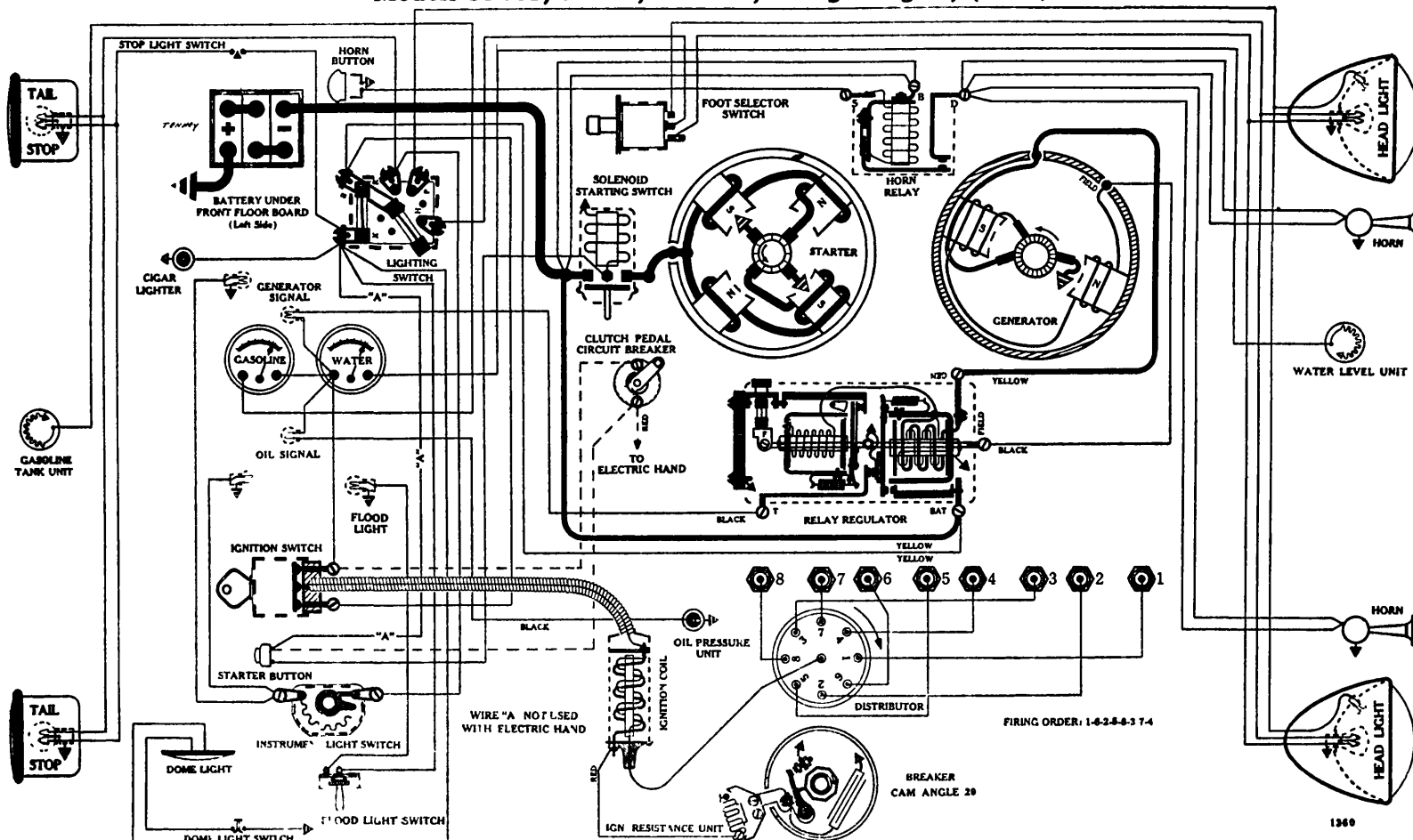
Cut-Out Relay—Closes—6.5 to 7.3 volts (hot or cold).
Opens—0 to 3 amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .030 inch, contacts closed.
Regulator—Contact Spring Tension—10 to 12 oz.
Points Open—7.9 volts.
Points Close—6.7 volts.
Contact Opening—.005 inch (minimum).
Core Gap—.020 inch (contacts closed).

LIGHTING

Switch—Soreng-Manegold, No. 5770-A.
Location—Behind instrument board.
Fuses—Two 20 amp fuses (type 3A-20) mounted on lighting switch.
Foot Selector Switch—Douglas, No. 5331.
Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320;
PARK—63; INSTRUMENT—63; SIGNALS—64; DOME—87;
FLOOD—63; VESTIBULE—87; STOP AND TAIL—1158.

HUDSON

Models 35-HT, 35-HU, 35-HHU, Straight Eights, (1935)



For complete information on the Electric Hand refer to the Technical Section.

BATTERY

Exide, XTL-19-17, 6 volts. Positive Terminal Grounded

Starting Capacity—130 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—4.3.
Lighting Capacity—5.4 amps. for 20 hours (108 amp. hour).
Box—Length, 11-13/16; width, 7-5/16; height, 7-15/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4061

Connection to Engine—Bendix Drive, Type A-1673.
Running Free—60 amps. at 5½ volts, 3700 R.P.M.
Cranking Engine—275 to 300 amps. at 4.3 volts.
Lock Torque—15½ pound-feet, 582 amps. at 3 volts.
Brush Spring Tension—44 to 56 oz. on each (new brushes).
Solenoid Starting Switch—Auto-Lite, SS-4001.
Push Button Starting Control Switch—Soreng-Manegold, A-5550-A.
Armature—Auto-Lite, MAB-2113.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGP-4001-A (Engines 55000-65246)
Auto-Lite, IGP-4001-B (Engines 65247 and up)
(Full Automatic Spark Advance on both)

Breaker—Contact separation .015 inch.
Cam Angles—Points closed 29 degrees; open 16 degrees.
Contact Spring Tension—18 to 20 oz.

Timing—Dist IGP-4001-A—With No. 1 piston on compression stroke, slowly turn engine until flywheel mark "U D C. 1-8" is within ¼ inch (or 4½ flywheel degrees) of the pointer cast in flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Dist IGP-4001-B—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "U D C. 1-8" is directly in line with pointer on timing inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (Champion type J-7); Gap .022 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—17½ degrees (Distributor), both distributors.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
800	400		6
1900	950		12
3000	1500		17
3900	1950		17½
4000 (Max.)	2000		

The following is the Spark Advance Curve for the Auto-Lite IGP-4001-B Dist.

R.P.M.	Volts	Amps.	R.P.M.	Volts
600	300	Start		
700	350	8		
800 (Intermediate)	400	6		
1700	850	10		
2610	1305	14		
3400 (Max.)	1700	17½		

Ign. Coil, Lock Switch & Cable Assembly Complete—A-L, IG-4606.

Ign. Coil Only—A-L, IG-3224-S.

Ign. Switch & Cable Assembly Less Lock—A-L, CE-2233-S.

Ignition Lock Number—Briggs & Stratton 50184.

Ignition Key Series—Briggs & Stratton H601-H1100.

Ignition Key Blank Number—Briggs & Stratton 42755.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBK-4602-1 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	775	6.2	10	1175	7.1
2	850	6.3	12	1280	7.3
4	925	6.5	16	1450	7.6
6	975	6.7	18	1850	7.8
8	1085	7.	22	2400 (Max.)	8.3

Motoring Freely—5 amps. at 6 volts.

Max. Stall Current—25 to 28 amps. at 5½ volts.

Field Test—3.9 amps. at 6 volts across field coils in series.

Field Fuse—7½ amp. (type 1A-7½) in regulator unit.

Brush Spring Tension—22 oz. Max. on each (new brushes).

Armature—Auto-Lite, GBK-2055.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4304-A

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

For data see Hudson, Model 35-GH, Big Six, 1935.

LIGHTING

Switch—Soreng-Manegold, No. 5770-A.

Location—Behind instrument board.

Fuses—Two 20 amp fuses (type 3A-20) mounted on lighting switch.

Foot Selector Switch—Douglas, No. 5331.

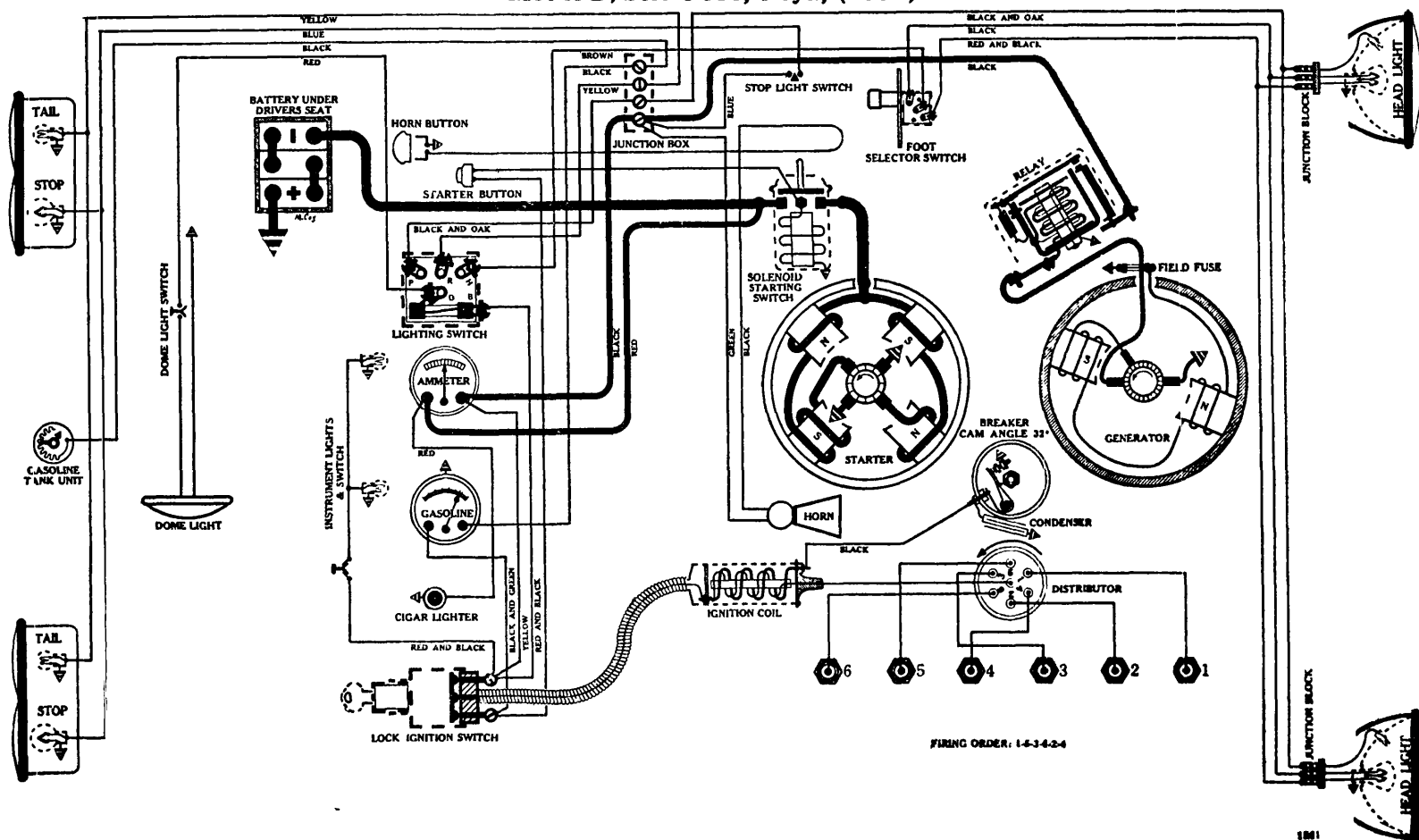
Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320;

PARK—63; INSTRUMENT—63; SIGNALS—64; DOME—87;

FLOOD—63; VESTIBULE—87; STOP AND TAIL—1158.

HUPMOBILE

Model D, Series 518, 6 cyl., (1935)



BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—122 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.3.
Lighting Capacity—5 amps. for 20 hours (100 amp. hour).
Box—Length, 10-5/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAJ-4039

Connection to Engine—Bendix Drive, Type LCD11FX-10.
Running Free—67 amps. at 5½ volts, 4800 R.P.M.
Cranking Engine—190 to 220 amps. at 5 volts.
Lock Torque—12 pound-feet, 550 amps. at 3 volts.
Brush Spring Tension—31 to 42 oz. on each (new brushes).
Solenoid Starting Switch—Auto-Lite, SS-4002.
Armature—Auto-Lite, MAJ-2048.

IGNITION

A-L Tests No. 378 Rotation, L. H., Top View
Auto-Lite, IGB-4319 and IGC-4058
(Full Automatic Spark Advance)

Characteristics of both units same, except as noted

Breaker—Contact separation .018 inch.
Cam Angles—Points closed 32 degrees; open 28 degrees (IGB-4319).
Cam Angles Points closed 37 degrees; open 23 degrees (IGC-4058).
Contact Spring Tension—17 to 19 oz.

Timing—With No. 1 piston on compression stroke, slowly turn engine until flywheel mark "IGN. ADV." (found 7 degrees ahead of mark "DC 1-6") is in line with finished bosses on front face of clutch housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type C-7); Gap .026 to .030 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—7 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
800	400		1
1100	550		3
1660	830		6
2500	1250		7
2800 (Max.)	1400		

Coil and Lock Switch Assembly—Auto-Lite, IG-4619.

Ignition Lock Number—Briggs & Stratton 45084.

Ignition Key Series—Briggs & Stratton 5 digit.

Ignition Key Blank Number—Briggs & Stratton 42755.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBK-4604 (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	760	6.2	10	1150	7.1
2	850	6.3	12	1250	7.3
4	925	6.5	14	1400	7.6
6	970	6.7	16	1600	7.8
8	1100	7.	18	1800 (Max.)	8.

Motoring Freely—5½ amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 5½ volts.

Field Test—4 amps. at 6 volts, across field coils in series.

Field Fuse—5 amps. (type 1A-5).

Brush Spring Tension—22 oz. Max. on each (new brushes).

Armature—Auto-Lite, GBK-2055.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4023

Closes—6½ to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Hupmobile, No. 91605, manufactured by Henry Cole—F. C. Hersee Companies.

Location—Behind instrument board.

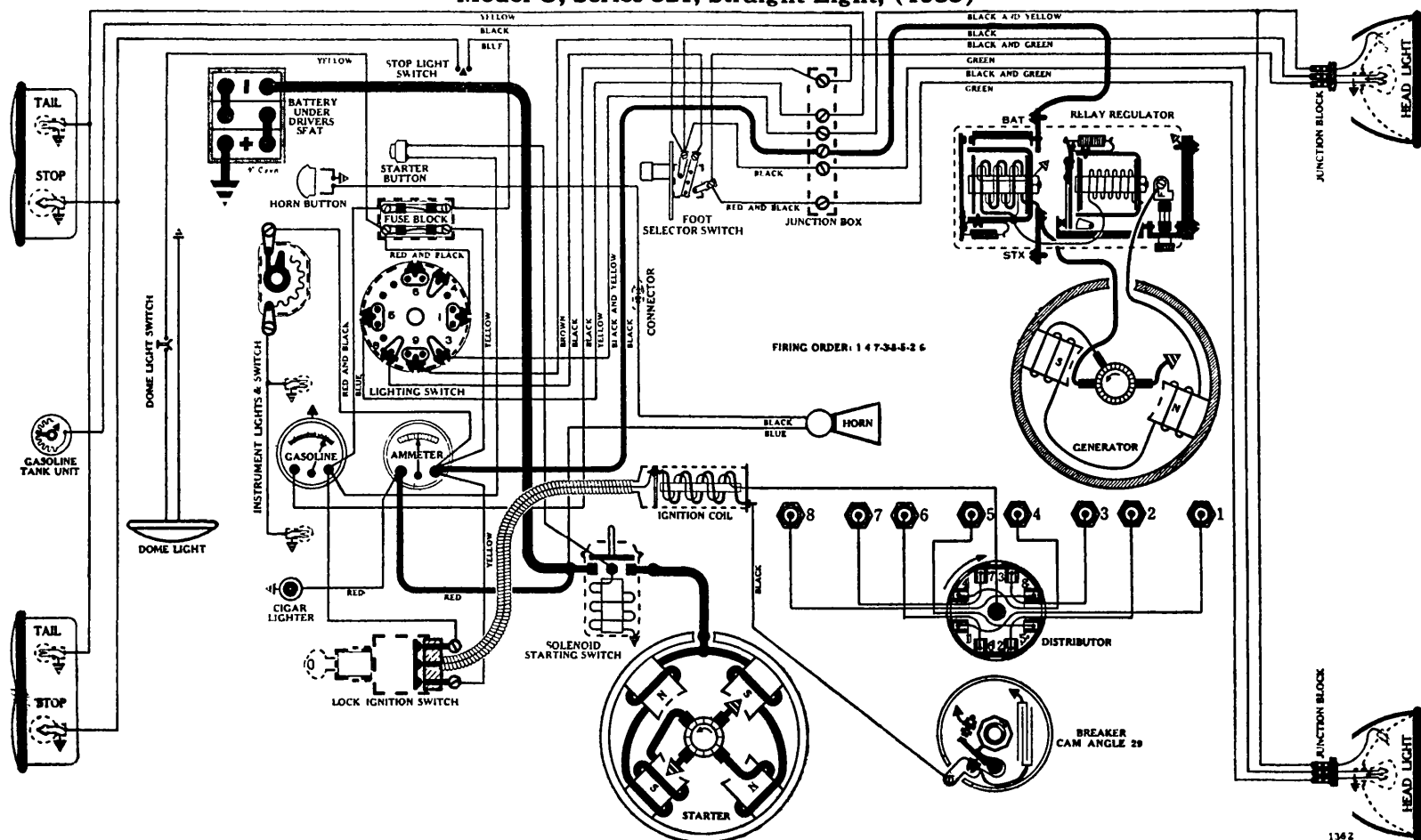
Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back.

Foot Selector Switch—Clum, No. 9505.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

HUPMOBILE

Model O, Series 521, Straight Eight, (1935)



BATTERY

Willard, WH-2-15, 6 volts. Positive Terminal Grounded.

Starting Capacity—140 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—4.3.

Lighting Capacity—5.9 amps. for 20 hours (119 amp. hour).

Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite, MAB-4066

Connection to Engine—Bendix Drive, Type RCD10FXD-9.

Running Free—60 amps. at 5½ volts, 3700 R.P.M.

Cranking Engine—245 to 260 amps. at 4.9 volts.

Lock Torque—15½ pound-feet, 582 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4002.

Armature—Auto-Lite, MAB-2046.

IGNITION

A-L Test No. 354 Rotation, R. H., Top View

Auto-Lite, IGP-4003

(Full Automatic Spark Advance)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 29 degrees; open 16 degrees.

Contact Spring Tension—18 to 20 oz.

Timing—With No. 1 piston on compression stroke, bring flywheel mark (found 15/16 inches, or 9 degrees, ahead of "18-DC"), so that it will register with center line of flywheel housing peep hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type C-7); Gap .026 to .030 inch.

Firing Order—1-4-7-3-8-5-2-6.

Automatic Advance—6½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
800	400	Start
1530	765	2
2270	1135	4
3000	1500	6
3200 (Max.)	1600	6½

Ign. Coil, Lock Switch & Cable Assembly Complete—A-L, CE-4611.

Ign. Coil Only—A-L, CE-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-BCS.

Ignition Lock Number—Briggs & Stratton 45084.

Ignition Key Series—Briggs & Stratton 5 digit.

Ignition Key Blank Number—Briggs & Stratton 42755.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4620-5 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.6	12	1150	7.5
2	750	6.7	16	1400	7.9
4	850	6.9	20	1700	8.2
6	875	7.	21½	2000	8.3
8	950	7.1	22	2200 (Max.)	8.4

Running Free—5 to 5½ amps. at 6 volts.

Max. Stall Current—32 amps. at 4½ volts.

Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5), in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116-B.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4302-A

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.5 to 7.3 volts (hot or cold).

Opens—0 to 3 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

Regulator—

Contact Spring Tension—10 to 12 oz.

Points Open—8.3 volts.

Points Close—7.2 volts.

Contact Opening—.005 inch (minimum).

Core Gap—.020 inch (contacts closed).

LIGHTING

NOTE—The two upper and the two lower filaments in the head lights now work together. No provision is made for crossing the beams.

Switch—Clum, No. 9526.

Location—Behind instrument board.

Fuses—Two 20 amp. fuses (type 3A-20) in fuse block on dash.

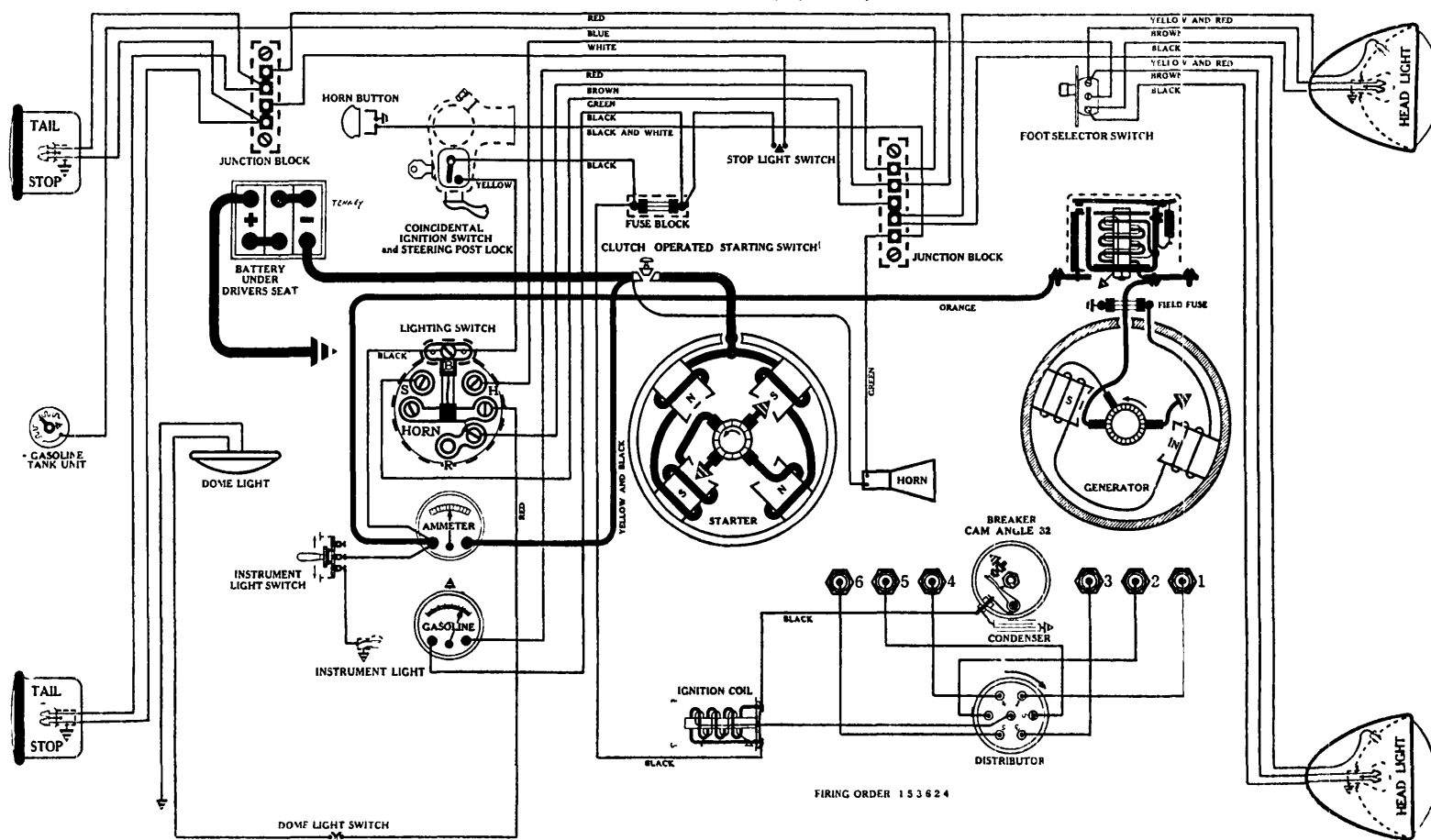
Foot Selector Switch—Clum, No. 9505.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320;

PARK—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL

- 63.

M del 3510, 6 cyl., (1935)



Globe, No. 71, 6 volts. Positive Terminal Grounded
Starting Capacity—120 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.5.
Lighting Capacity—5.1 amps. for 20 hours (102 amp. hour).
Box—Length, 9-1/16; width, 7 7/8; height, 8-5/16 inches.

Connection to Engine—Bendix Drive, Type LCD11FX-10.
Running Free—60 amps. at 5½ volts, 3700 R.P.M.
Cranking Engine—160 to 175 amps. at 5 volts.
Lock Torque—15½ pound-feet, 582 amps. at 3 volts.
Brush Spring Tension—31 to 42 oz. on each (new brushes).
Starting Switch—Auto-Lite, SW-4005, mounted on toe board,
 operated by fully depressing clutch pedal.
Armature—Auto-Lite, MAB-2057.

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 32 degrees; open 28 degrees.
Contact Spring Tension—17 to 19 oz.
Timing—With No. 1 piston on compression stroke, slowly turn engine until the mark "Ign" (the first line) on front vibration dampener is directly under pointer on chain cover. With rotor under No. 1 Dist Cap Terminal, breaker points should just open.

600	300	Start
1000	500	2
1400	700	4
1800	900	6
2200	1100	8
2600 (Max.)	1300	10

600	300	Start
900	450	1
1200	600	2
1500	750	3
1800	900	4
2100 (Max.)	1050	5

Ignition Coil—Auto-Lite, CE-440E
Ignition Switch—Oakes Steering Post and Ignition Lock No. 301193.
Ignition Lock Number—Briggs & Stratton 45777.
Ignition Key Series—Briggs & Stratton N1201-N1400.
Ignition Key Blank Number—Briggs & Stratton 82078.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.2	10	1150	7.1
2	850	6.3	14	1400	7.6
4	900	6.5	16	1600	7.8
6	950	6.7	18	1800 (Max.)	8.
8	1050	7.			

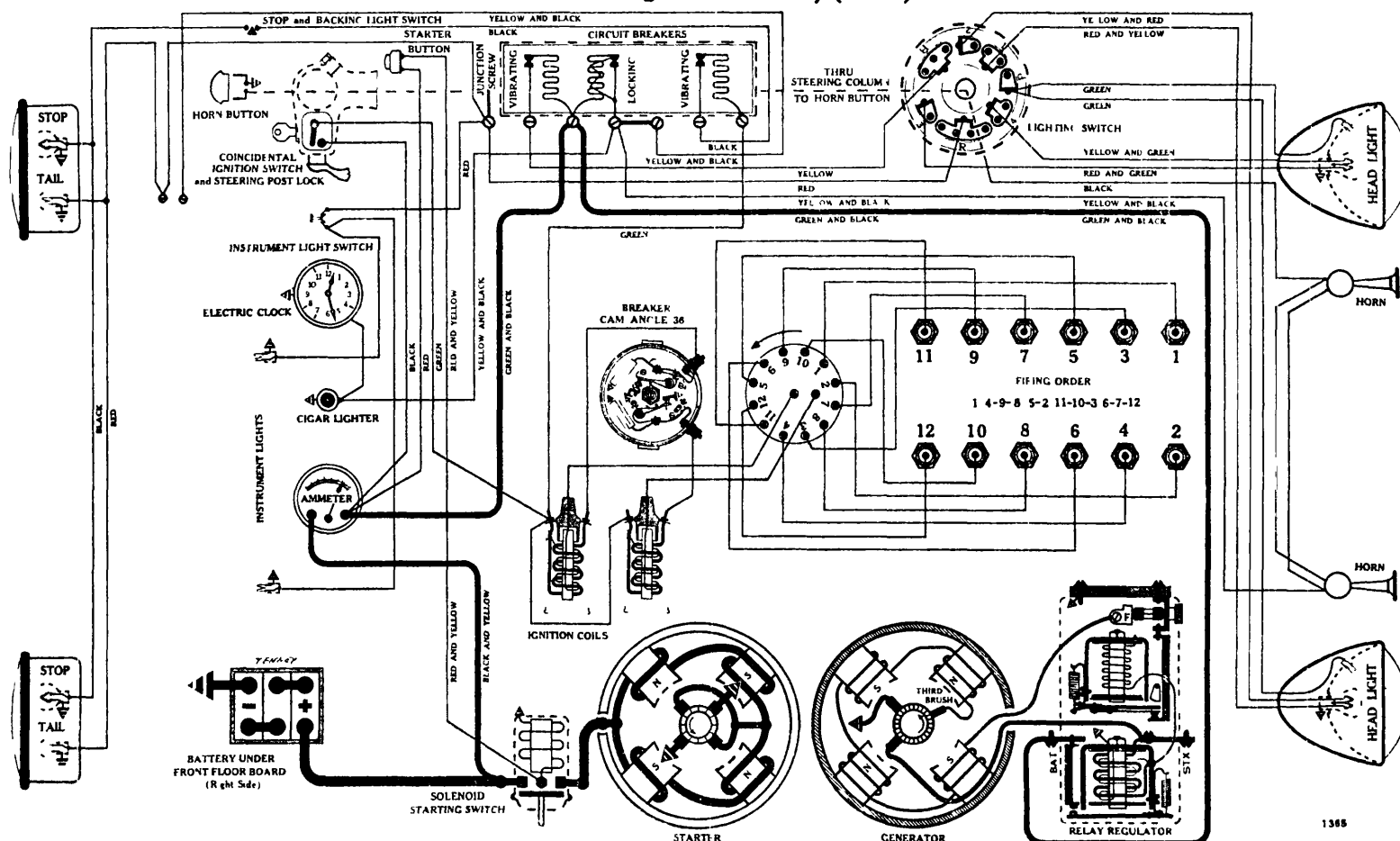
washers.

Closes— $6\frac{3}{4}$ to $7\frac{1}{2}$ volts.
Opens— $\frac{1}{2}$ to $2\frac{1}{2}$ amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .030 inch, contacts closed.

Switch—Delco-Remy, 478-N.
Location—Behind instrument board.
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.
 Single 10 amp. fuse (type 3A-10), mounted on fuse block behind instrument board.
Foot Selector Switch—Delco-Remy, 465-Z.
Lamps—Refer to "Lamp Data" in Technical Section. **HEAD—2320;**
PARK—55; INSTRUMENT—63; DOME—63; STOP AND TAIL
—1158.

LINCOLN

Model 67 Degr e "V " 12, (1935)



BATTERY

Exide, X-21-L, 6 volts. Negative Terminal Grounded
Starting Capacity—175 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—6.1.
Lighting Capacity—7.3 amps. for 20 hours (147 amp. hour).
Box—Length, 14¼; width, 7-5/16; height, 8¾ inches.

STARTER

**Rotation, L. H., Com. End
Auto-Lite, MAO-4003-B**

Connection to Engine—Bendix Drive, Type RB10FXXTD.
Rating Free—44 amps. at 5½ volts, 2700 R.P.M.
Cranking Engine—200 to 225 amps. at 5.4 volts.
Lock Torque—34 pound-feet, 715 amps. at 3 volts.
Brush Spring Tension—24 to 32 oz. on each (new brushes).
Solenoid Starting Switch—Auto-Lite, SS-4004.
Armature—Auto-Lite, MAO-2006.

IGNITION

A-L Test No. 395 (4003) Rotation, L. H., Top View
A-L Test No. 446 (4003-A) Auto-Lite, IGM-4003 and IGM-4003-A
(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch on each.
Cam Angles—Points closed 36 degrees; open 24 degrees.
Contact Spring Tension—20 to 22 oz. on each.

Synchronizing—Movable points open 33 $\frac{1}{3}$ degrees after stationary. Unequal intervals of 33 $\frac{1}{3}$, 26 $\frac{2}{3}$, 33 $\frac{1}{3}$, etc. degrees between interruptions. The stationary, or right hand set of breaker points control the right hand ignition coil, which distributes current through the "off center" high tension terminal on the distributor cap, and fires the right bank, or even numbered cylinders.

Timing—Remove inspection cover on flywheel housing. Remove No 2 spark plug, and slowly turn engine until No 2 piston is coming up on compression stroke. On cars with IGM 4003 distributors, stop when flywheel mark "A-2" is opposite pointer. Cars with IGM-4003 A distributors stop when flywheel mark "D2 12C" is opposite pointer. In this position the right hand, or stationary set of breaker points should just open. The line on flywheel marked "A 1" or "D1 11C" is for locating the position of (or synchronizing) the movable set of breaker points.

Spark Plugs—18-MM (Champion type 7); Gap .022 inch.

Firing Order—1-4-9-8-5-2-11-10-3-6-7-12

NOTE: All odd cylinder numbers on left bank; No 1 nearest radiator. All even numbers on right bank (see diagram). High tension wires run from numbered terminals on Dist Cap to corresponding numbers on cylinder blocks.

Automatic Advance— $8\frac{1}{2}$ degrees (Distributor)—(IGM-4003)

Automatic Advance—12 degrees (Distributor)—(IGM-4003-A)			
Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	
600	300	—	Start
1300	650		2 -
2000	1000		4
3600 (Max.)	1800		8½

The following is the Spark Advance Curve for the Aut -Lite
IGM-4003-A Dist.

600	300	Start
900 (Intermediate)	450	4
2300	1150	8
3700 (Max.)	1850	12

Ignition Coils—Auto-Lite, CE-4001-L.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301172.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBC-4103 (Driven by Timing Chain)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	400	6.3	16	720	7.6
4	460	6.7	20	930	7.8
8	520	7.	22	1250 (Max.)	8.

Motoring Freely—5 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 6 volts.

Field Test—2.4 to 2.7 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5), in regulator unit.

Brush Spring Tension—27 oz. Max. on each (new brushes).

Armature—Auto-Lite, GBC-2035.

Third Brush Adjustment—Turn adjusting screw, found on outside of commutator end housing just below oil cup, clockwise to increase charging rate.

RELAY-REGULATOR

Auto-Lite, TC-4302-A or 4305-A

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

For Data refer to "Auto-Lite Two-Stage Regulators" in Technical Section.

LIGHTING

Switch—R.B.M. Mfg. Co., Type 1301.

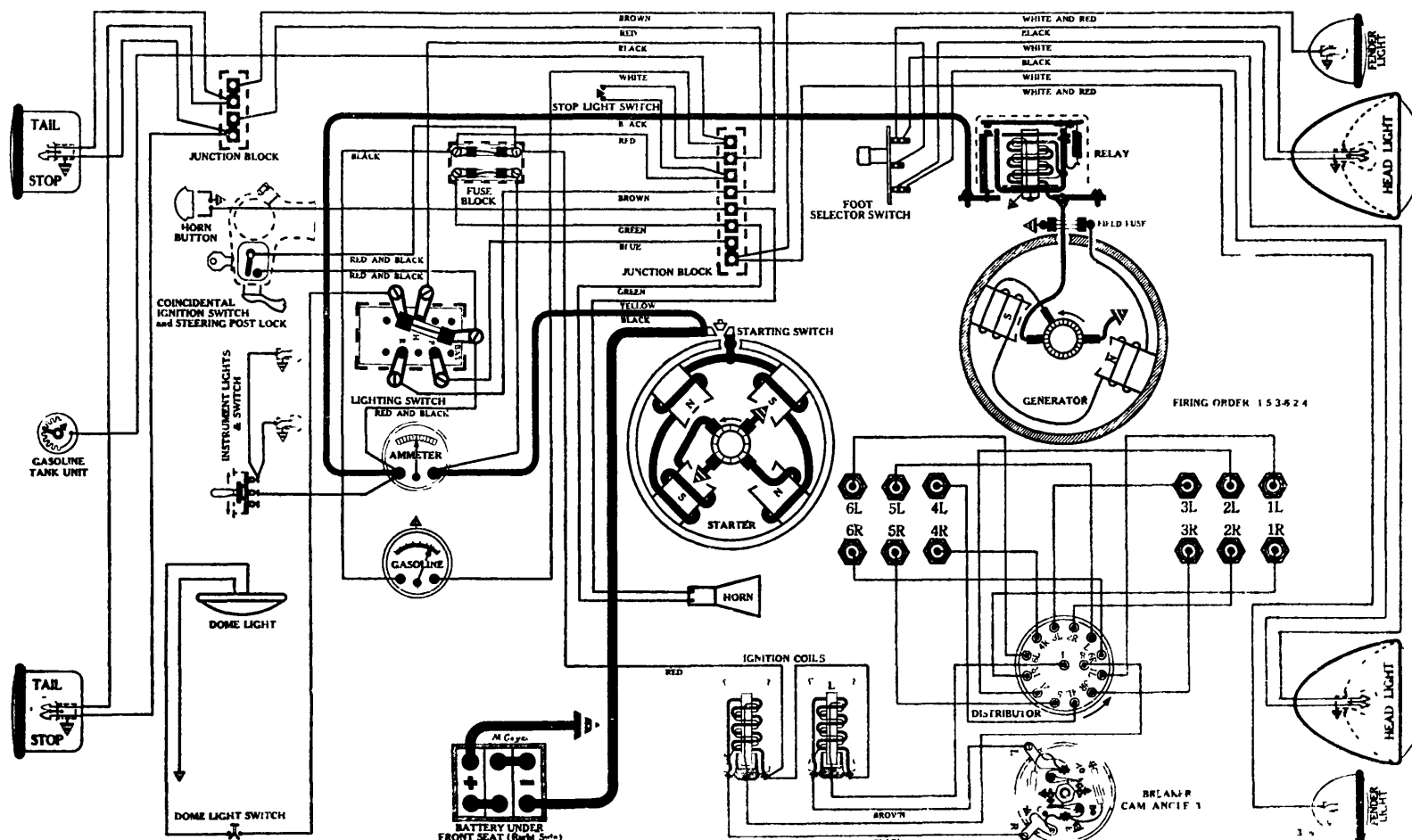
Location—Foot of steering column.

Circuit Breaker re—Steering combination. Vibrating—Starts 25 to 30 amps. Operates 10 to 15. Lock-Out—Starts 25 to 30 amps. Operates with discharge of less than 1 amp.

Lamps—Refer to "Lamp Data" in Technical Section. **HEAD**—2320; **PARK**—55; **INSTRUMENT**—81; **DOME**—81; **STOP**—87; **TAIL**—63.

NASH

Model 3520, Twin Ignition Advanced Six, (1935)



BATTERY

U.S.L., KW-13-A, 6 volts. Positive Terminal Grounded
 Starting Capacity—120 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1.
 Lighting Capacity—5 amps. for 20 hours (100 amp. hour).
 Box—Length, 9; height, 7-1/16; width, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MAB-4053

Connection to Engine—Bendix Drive, Type LCD11FX-10.
 Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.
 Cranking Engine—160 to 170 amps. at 4.9 volts.
 Lock Torque—15 1/2 pound-feet, 582 amps. at 3 volts.
 Brush Spring Tension—44 to 56 oz. on each (new brushes).
 Starting Switch—Auto-Lite, VC-4002 (vacuum controlled, clutch pedal operated).
 Armature—Auto-Lite, MAB-2057.

IGNITION

A-L Test No. 391 Rotation, L. H., Top View
 Auto-Lite, IGE-4012
 (Full Automatic Spark Advance)

Breakers—Contact separation .020 inch on each.
 Cam Angles—Points closed 35 degrees; open 25 degrees.
 Contact Spring Tension—17 to 19 oz. on each.
 Synchronizing—Adjust both breakers to open simultaneously
 Equal 60 degree intervals between interruptions.
 Timing—With No 1 piston on compression stroke, slowly turn engine until the mark "Ign" (the first line) on front vibration dampener is directly under pointer on timing chain cover. With rotor ends under No 1 Dist Cap Terminals, both sets of breaker points should just open.
 Spark Plugs—14-MM (AC type K-12); Gap .025 inch. (Radio .030 inch).

Firing Order—1-5-3-6-2-4.

Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400	200	Start
1040	520	6
1480	740	10
1900	950	14
2000 (Max.)	1000	15

Ignition Coils—Auto-Lite, CE-4402.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301175.

Ignition Lock Number—Briggs & Stratton 45777.

Ignition Key Series—Briggs & Stratton N1201-N1400.

Ignition Key Blank Number—Briggs & Stratton 82078.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4601-3 (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	680	6.2	10	1095	7.1
2	795	6.3	12	1200	7.3
4	850	6.5	14	1350	7.6
6	900	6.7	16	1540	7.8
8	990	7.	18	1700 (Max.)	8.

Motoring Freely—5 1/2 amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 5 1/2 volts.

Field Test—4 1/2 amps. at 6 volts, across field coils in series.

Field Fuse—7 1/2 amps. (type 1A-7 1/2).

Brush Spring Tension—36 oz. max. on each (new brushes).

Armature—Auto-Lite, GAR-2214.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

Closes—6 3/4 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5620-A.

Location—Behind instrument board.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch. Two 10 amp. fuses (type 3A-10), mounted on fuse block behind instrument board.

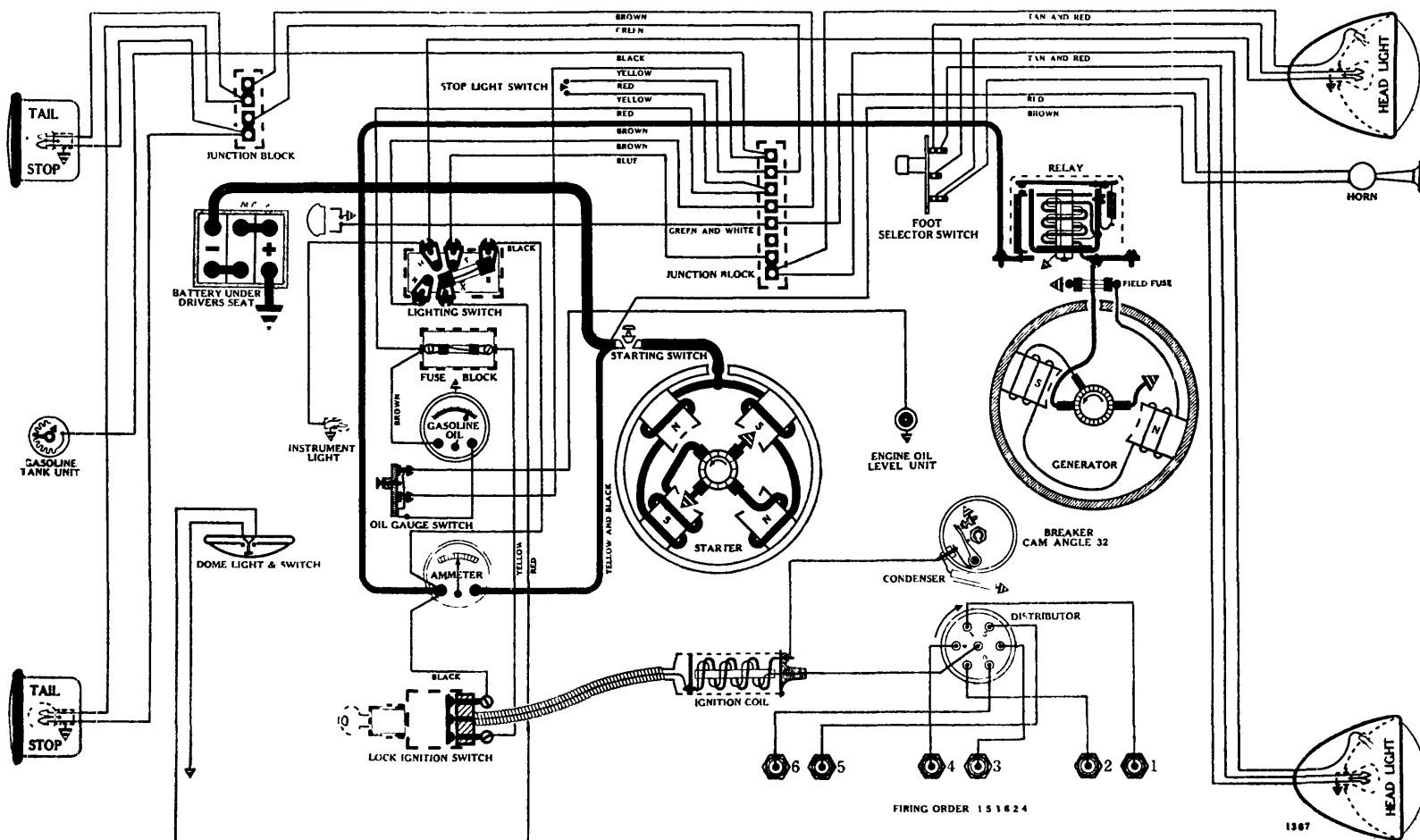
Foot Selector Switch—Douglas No. 5392.

Lamps—Refer to "Lamp Data" in Technical Section HEAD—2320; PARK—55; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

NASH

Mod 1 3540 or 3640, Single Ignition Six, (1935)

NOTE: Model 3540 officially announced May 1935 and changed to Model 3640 June 1, 1935



BATTERY

U.S.L., KW-13-A, 6 volts. Positive Terminal Grounded
Starting Capacity—120 amps. for 20 minutes.
Minutes of Discharge at 300 amps., Zero Degrees F.—3.1.
Lighting Capacity—5 amps. for 20 hours (100 amp. hour).
Box—Length, 9; height, 7-1/16; width, 9 1/8 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4068

Connection to Engine—Bendix Drive, Type LCD11FX-10.
Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.
Cranking Engine—155 to 175 amps. at 5.1 volts.
Lock Torque—15 1/2 pound-feet, 582 amps. at 3 volts.
Brush Spring Tension—31 to 42 oz. on each (new brushes).
Starting Switch—Auto-Lite, SW4001, mounted on sub-frame, operated by fully depressing clutch pedal.
Armature—Auto-Lite, MAB-2057.

IGNITION

A-L Test No. 449 Rotation, R. H., Top View
Auto-Lite, IGB-4328
(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 32 degrees; open 28 degrees.
Contact Spring Tension—17 to 19 oz.
Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "I G N" (first mark) on front vibration dampener is directly under pointer on timing chain cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—18-MM (AC type G-8); Gap .025 inch. If radio equipped set gap to .030 inch.
Firing Order—1-5-3-6-2-4.
Automatic Advance—7 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
600	300		1
800	400		2
1000	500		3
1200	600		4
1400	700		5
1600	800		6
1800	900		7
2000 (Max.)	1000		

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4626.
Ign. Coil Only—IG-3224-S.
Ign. Switch and Cable Assembly Less Lock—CE-1187-BES.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4618-2 (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	12	1350	7.5
4	900	6.8	16	1740	7.8
8	1125	7.2	18	2200 (Max.)	8.0

Motoring Freely—4 1/2 amps. at 6 volts.
Max. Stall Current—22 to 24 amps. at 5.4 volts.
Field Test—3.7 to 4.1 amps. at 6 volts.
Field Fuse—5 amps. (type 1A-5).
Brush Spring Tension—36 oz. Max. on each (new brushes).
Armature—Auto-Lite, GAR-2155.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014.

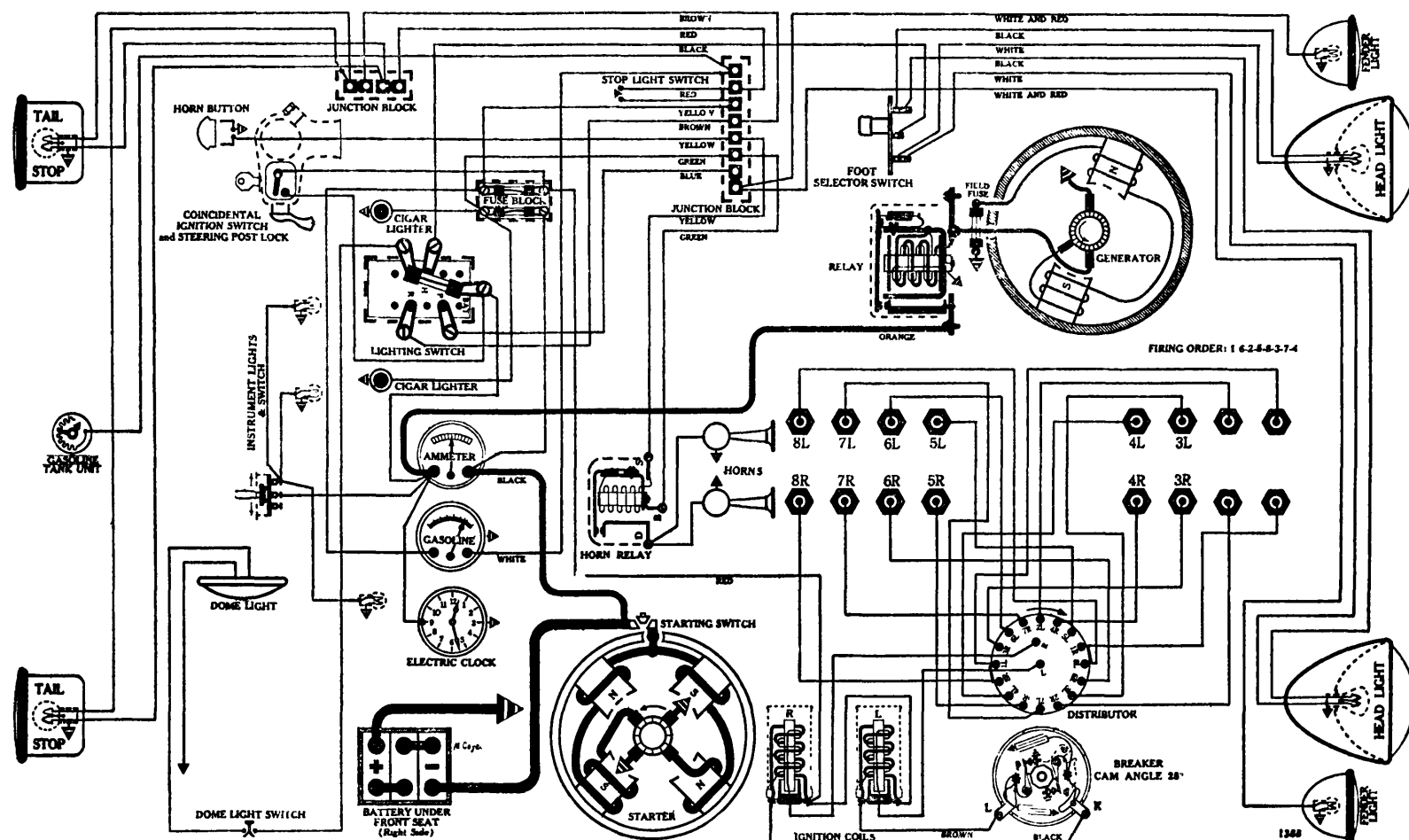
Closes—6 3/4 to 7 1/2 volts.
Opens—1/2 to 2 1/2 amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, 5820-A.
Location—Behind instrument board.
Fuses—Lighting, Single 20 amp. (type 3A-20), mounted on switch back. Gas Gauge and Stop Light, 20 amp. (type 3A-20) on fuse block behind instrument board.
Foot Selector Switch—Douglas No. 5392.
Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—63; INSTRUMENT—63; DOME—82; STOP AND TAIL—1158.

NASH

Mod ls 3580, Advanc d and Ambassador Straight Eights, (1935)



BATTERY

U.S.L., KW-15-A, 6 volts. Positive Terminal Grounded
Starting Capacity—140 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—4.
Lighting Capacity—5.8 amps. for 20 hours (116 amp. hour).
Box—Length, 10 1/4; width, 7-1/16; height, 9 1/8 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4054

Connection to Engine—Bendix Drive, Type LCD11FX-10.
Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.
Cranking Engine—250 to 260 amps. at 5.2 volts.
Lock Torque—15 1/2 pound-feet, 582 amps. at 3 volts.
Brush Spring Tension—44 to 56 oz. on each (new brushes).
Starting Switch—Auto-Lite, VC-4003 (Vacuum controlled, Clutch Pedal operated).
Armature—Auto-Lite, MAB-2047.

IGNITION

A-L Test No. 391 Rotation, R. H., Top View
Auto-Lite, IGK-4101
(Full Automatic Spark Advance)

Breakers—Contact separation .018 inch on each.
Cam Angles—Points closed 28 degrees; open 17 degrees.
Contact Spring Tension—22 to 26 oz. on each.
Synchronizing—Adjust both breakers to open simultaneously. Equal 45 degree intervals between interruptions.
Timing—With No. 1 piston on compression stroke, slowly turn engine until the mark "Ign" (the first line) on front vibration dampener is directly under pointer on timing chain cover. With rotor ends under No. 1 Dist. Cap Terminals, both sets of breaker points should just open.
Spark Plugs—14-MM (AC type K-12); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400	200	Start
1040	520	6
1480	740	10
1900	950	14
2000 (Max.)	1000	15

Ignition Coils—Auto-Lite, CE-4402.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 801175.

Ignition Lock Number—Briggs & Stratton 45777.
Ignition Key Series—Briggs & Stratton N1201-N1400.
Ignition Key Blank Number—Briggs & Stratton 82078.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4601-3 (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	680	6.2	10	1095	7.1
2	795	6.3	12	1200	7.3
4	850	6.5	14	1350	7.6
6	900	6.7	16	1540	7.8
8	990	7.	18	1700 (Max.)	8.

Motoring Freely—5 1/2 amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 5 1/2 volts.

Field Test—4 1/2 amps. at 6 volts, across field coils in series.

Field Fuse—7 1/2 amps. (type 1A-7 1/2).

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2214.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

Closes—6 1/2 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Gore Cap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5620-A.

Location—Behind instrument board.

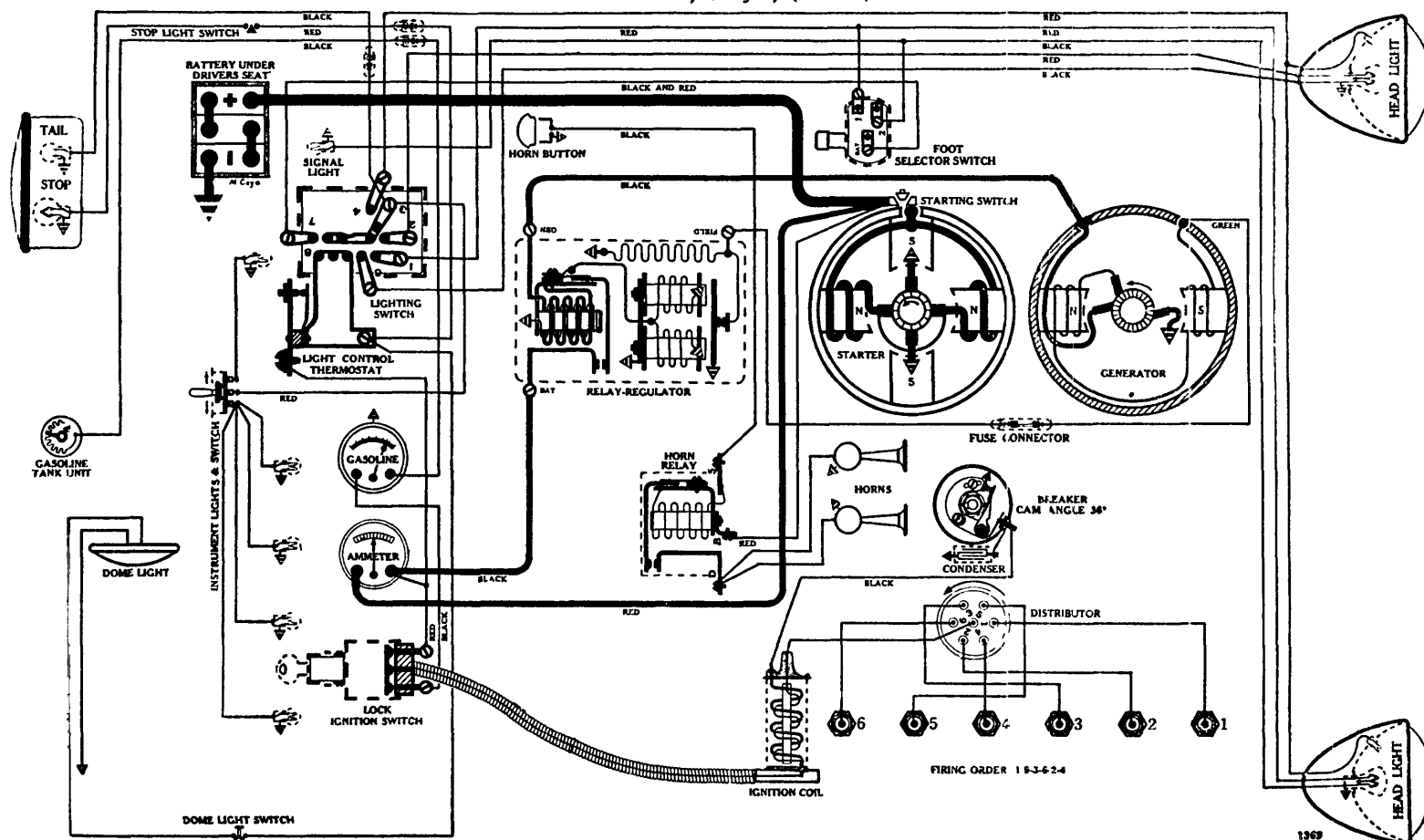
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch. Two 10 amp. fuses (type 3A-10), mounted on fuse block behind instrument board.

Foot Selector Switch—Douglas No. 5392.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

OLDSMOBILE

Mod 1 F-35, 6 cyl., (1935)



BATTERY

Delco-Remy, 15-T, 6 volts. Negative Terminal Grounded
 Starting Capacity—115 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—2.75.
 Lighting Capacity—4.7 amps. for 20 hours (94 amp. hour).
 Box—Length, 9-1/16; width, 7; height, 8 3/4 inches.

STARTER

D-R Test No. 368 Rotation, L. H., Com. End
 Delco-Remy, 734-K

Connection to Engine—Mechanical gear shift, incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.
 Running Free—65 amps. at 5 volts, 5000 R.P.M.
 Cranking Engine—175 to 185 amps. at 5.4 volts.
 Lock Torque—12 pound-feet, 475 amps. at 3.63 volts.
 Brush Spring Tension—24 to 28 oz. on each (new brushes).
 Starting Switch—Delco-Remy, 820052.
 Armature—Delco-Remy, 823881.

IGNITION

D-R Test No. 1072 Rotation, L. H., Com. End
 Delco-Remy, 622-Y
 (Full Automatic Spark Advance)

Breaker—Contact separation .022 inch.
 Cam Angles—Points closed 36 degrees; open 24 degrees.
 Contact Spring Tension—17 to 21 oz.

Timing—Loosen hold down plate bolts, under distributor, and bring arrow point in center "O" position, then tighten bolts. Loosen distributor clamp bolt so that entire unit may be rotated one way or the other. Remove timing hole cover plate found on left side of flywheel housing. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "IGN" (located approximately one tooth ahead of the mark "T.D.C.") is directly under indicator pointer. With rotor under No. 1 Dist. Cap Terminal, turn distributor cup clockwise until breaker points just open. Tighten clamp bolt.

Spark Plugs—18-MM (AC type G-9); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—10 1/2 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
680	340	Start
800	400	1
1000 (Intermediate)	500	2 1/2
2160	1080	8
2700 (Max.)	1850	10 1/2

Ignition Coil—Delco-Remy, 536-E.
 Ignition Switch and Cable—Delco-Remy, 431-R.
 Ignition Lock Number—Briggs & Stratton 45792.
 Ignition Key Series—Briggs & Stratton 8000-9499.
 Ignition Key Blank Number—Briggs & Stratton 82078.

GENERATOR

D-R Test No. 1254 Rotation, L. H., Com. End
 Delco-Remy, 935-X (Belt Drive, Air Cooled)
 Same as Oldsmobile Model L-35 Straight Eight, 1935.

RELAY-REGULATOR

D-R Test No. 1297 Delco-Remy, 5585
 A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

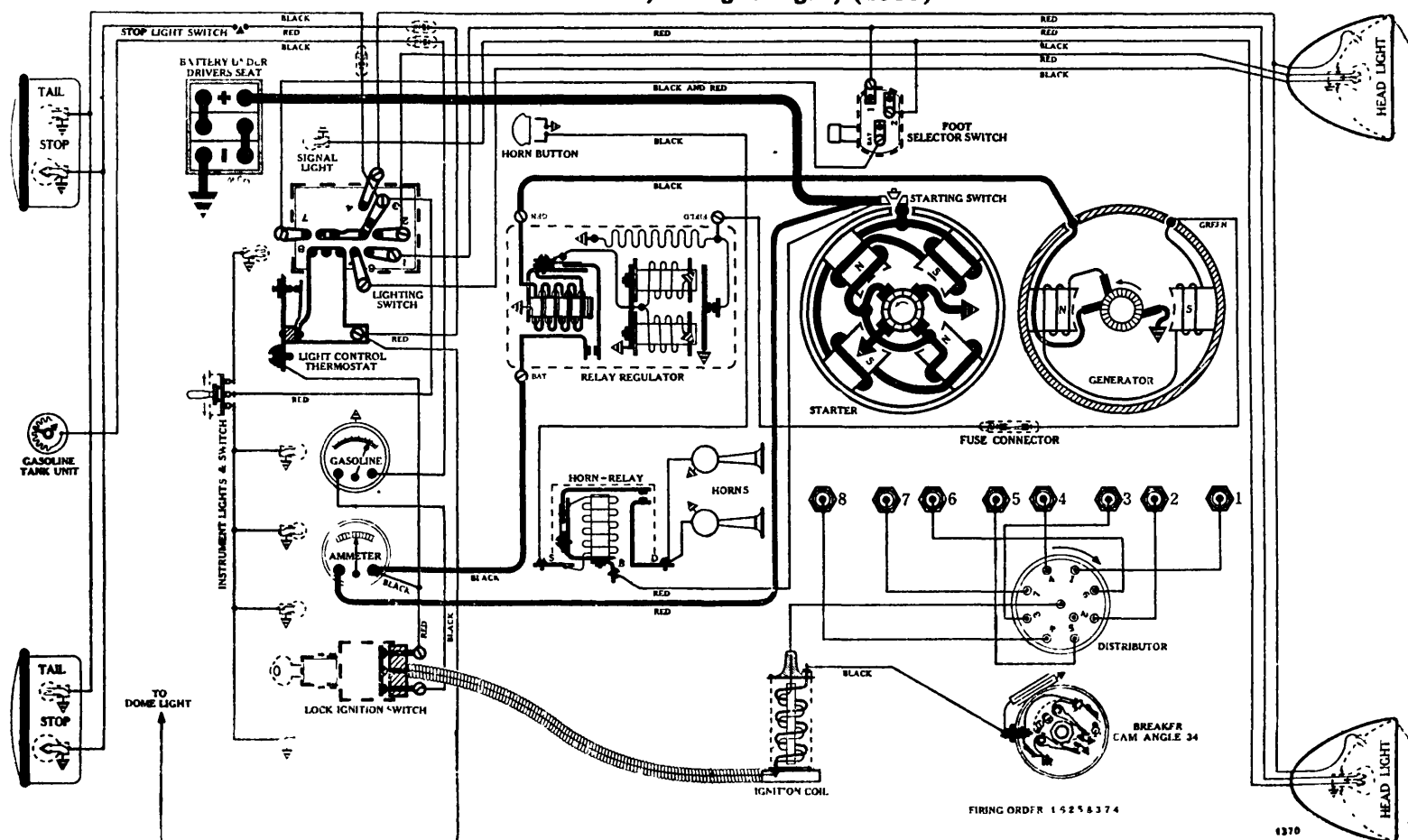
Cut-Out Relay—Closes—6.4 to 6.8 volts.
 Opens—0 to 3 amps. discharge at 6.3 volts.
 Contact Gap—.015 to .025 inch.
 Core Gap—.012 to .017 inch, contacts closed.
 Contact Spring Tension—.7 to .9 oz. (measured at contacts)
 Air Gap—.028 to .040 inch (armature pressed down against lower stop).
 Contact Opening—.008 to .013 inch (armature pressed down against lower stop).
 Armature Travel—.028 to .040 inch (armature released).
 Points Open—8.35 to 8.65 volts (70 degrees F.).
 Points Closed—7.3 to 7.7 volts (70 degrees F.).

LIGHTING

Switch—Delco-Remy, 479-U. A combination switch with overload lighting thermostat.
 Location—Behind instrument board, operated by pull knob.
 Overload Thermostat—Opens when load exceeds 30 amps. Limits current flow to from 5 to 15 amps.
 Horn Relay—Delco-Remy, 268-L.
 Foot Selector Switch—Delco-Remy, 471-Z.
 Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; INSTRUMENT—51; BEAM INDICATOR—51; DOME—81; STOP—87; TAIL—63.

OLDSMOBILE

Model L-35, Straight Eight, (1935)



BATTERY

Delco-Remy, 17-K, 6 volts. Negative Terminal Grounded
 Starting Capacity—131 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—3.25.
 Lighting Capacity—5.5 amps. for 20 hours (110 amp. hour).
 Box—Length, 10½; width, 7; height, 8½ inches.

STARTER

D-R Test No. 382 Rotation, L. H., Com. End
 Delco-Remy, 725-Y

Connection to Engine—Mechanical gear shift, incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—60 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—200 to 210 amps. at 5.3 volts.

Lock Torque—15 pound-feet, 600 amps. at 3.0 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test No. 1074 Rotation, R. H., Top View
 Delco-Remy, 662-R
 (Full Automatic Spark Advance)

Breakers—Contact separation .020 inch.

C m Angles—Points closed 34 degrees; open 56 degrees (each breaker separately). Points closed 34 degrees; open 11 degrees (both working together).

Contact Spring Tension—17 to 21 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Equal 45 degree intervals between interruptions. Stationary points fire cylinders 6-5-3-4; movable points fire cylinders 1-2-8-7.

Timing—Loosen hold down plate bolts under distributor, and bring arrow point in center "O" position, then tighten bolts. Loosen distributor clamp bolt so that entire unit may be rotated one way or the other. Remove timing hole cover plate found on left side of flywheel housing. Slowly turn engine until No. 6 piston is coming up on compression stroke. Stop when flywheel mark "IGN 6" is directly under indicator pointer. With rotor under No. 6 Dist. Cap Terminal turn distributor cup counter-clockwise until stationary breaker points just open. Tighten clamp bolt.

Spark Plugs—18-MM (AC type G-9); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—12 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
530	265	Start
600	300	½
830	415	2
1200 (Intermediate)	600	4½
3100	1550	9
4400 (Max.)	2200	12

Ignition Coil—Delco-Remy, 536-E.

Ignition Switch and Cable—Delco-Remy, 431-R.

Ignition Lock Number—Briggs & Stratton 45792.

Ignition Key Series—Briggs & Stratton 8000-9499.

Ignition Key Blank Number—Briggs & Stratton 82078.

GENERATOR

D-R Test No. 1254 Rotation, L. H., Com. End
 Delco-Remy, 935-X (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.5	12	1300	7.6
4	860	6.8	16	1680	7.9
8	1040	7.2	22	2800 (Max.)	8.5

Motoring Freely—3½ to 4 amps. at 6 volts.

Max. Stall Current—23 to 26 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAY-REGULATOR

D-R Test No. 1297 Delco-Remy, 5585

Same as Oldsmobile Model F-35, 6 cyl., 1935.

LIGHTING

Switch—Delco-Remy, 479-U. A combination switch with overload lighting thermostat.

Location—Behind instrument board, operated by pull knob.

Overload Thermostat—Opens when load exceeds 30 amps. Limits current flow to from 5 to 15 amps.

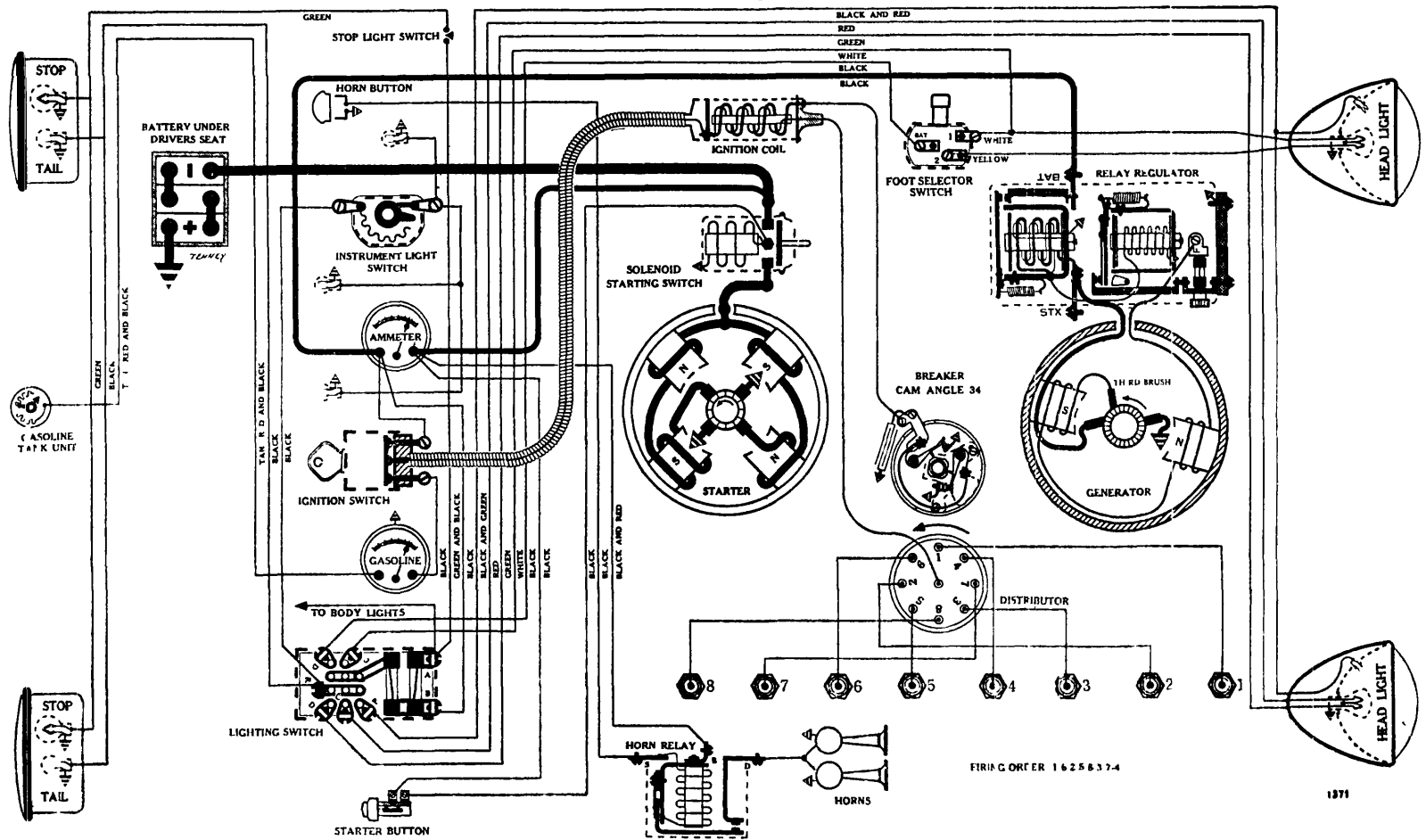
Horn Relay—Delco-Remy, 268-L.

Foot Selector Switch—Delco-Remy, 471-Z.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; INSTRUMENT—51; BEAM INDICATOR—51; DOME—81; STOP—87; TAIL—63.

PACKARD

Model On Twenty, Straight Eight, (1935)



BATTERY

Delco-Remy, 17-K, 6 volts. Positive Terminal Grounded
Starting Capacity—131 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.25.
Lighting Capacity—5.5 amps. for 20 hours (110 amp. hour).
Box—Length, 10%; width, 7; height, 8% inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAX-4006

Connection to Engine—Bendix Drive, Type A-1729.
Running Free—65 amps. at 5½ volts, 5300 R.P.M.
Cranking Engine—180 to 190 amps. at 5.4 volts.
Lock Torque—8 pound-feet, 410 amps. at 2 volts.
Brush Spring Tension—31 to 42 oz. on each (new brushes).
Solenoid Starting Switch—Auto-Lite, SS-4001.
Armature—Auto-Lite, MAW-2006.

IGNITION

Rotation, L. H., Top View Auto-Lite, IGH-4026 and IGH-4026-A
A-L Test No. 429 (4026); Test No. 436 (4026-A)
(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch.
Cam Angles—Points closed 34 degrees; open 56 degrees (each breaker separately). Points closed 34 degrees; open 11 degrees (both operating).
Contact Spring Tension—17 to 19 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.
Timing—Set pointer of Fuel Compensator at zero. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when white line on flywheel, located 5 degrees before flywheel mark "No. 1 UP D.C." is in line with pointer at the timing inspection hole. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—14-MM (AC type K-7); Gap .028 to .030 inch.
Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—10 degrees (Distributor).
Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist.)
600 300 Start
1280 640 3
1880 940 5
2800 1400 7
4400 (Max.) 2200 10

The following is the Spark Advance Curve for the Auto-Lite IGH-4026-A Dist.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
2110	1055	4
2870	1435	6
3630	1815	8
4400 (Max.)	2200	10

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CE-4607.

Ign. Coil Only—A-L, CE-3224-CS.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-ACS.

Ignition Lock Number—Briggs & Stratton 50184.

Ignition Key Series—Briggs & Stratton P1251-P1500.

Ignition Key Blank Number—Briggs & Stratton 52253.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4611-5 (Belt Drive, Air Cooled)

Performance Data—Gen. cold Field lead grounded to generator.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.6	12	1150	7.5
2	750	6.7	16	1400	7.9
4	850	6.9	20	1700	8.2
6	875	7.	21½	2000	8.3
8	950	7.1	22	2200 (Max.)	8.4

Running Free—5 to 5½ amps. at 6 volts.

Max. Stall Current—32 amps. at 4½ volts.

Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5), in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4302-A

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator.

For Data refer to Auto-Lite Two Stage Regulators in Technical Section.

LIGHTING

Switch—R.B.M. Mfg. Co., Type 1500.

Location—Behind instrument board. Lighting controlled by pull button on instrument panel.

Fuses—Two 20 amp. fuses (type 3A-20) mounted on switch back.

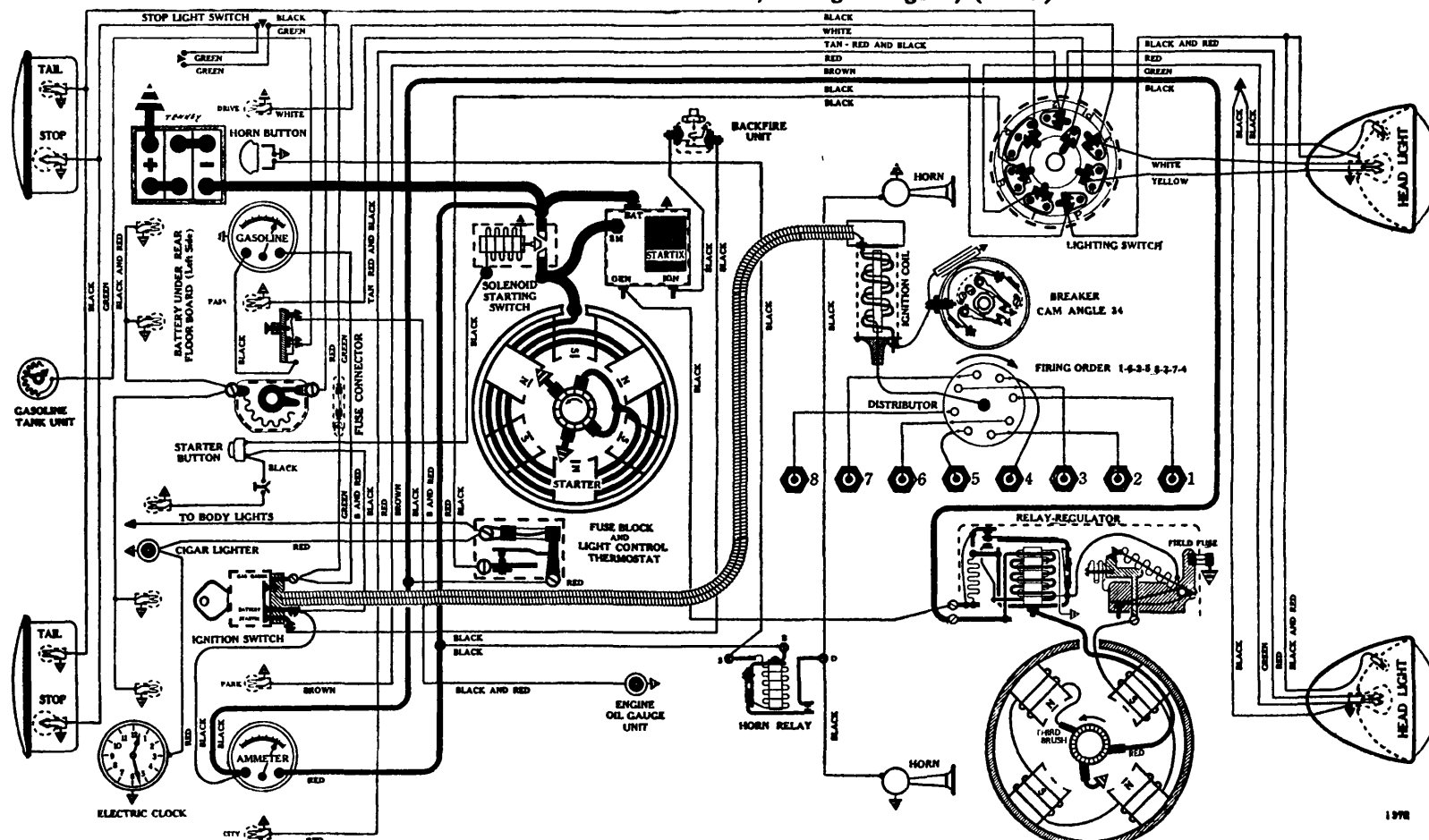
Foot Selector Switch—Delco-Remy, 471-Z.

Horn Relay—Delco-Remy, 266-TK.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2330; PARK—55; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

PACKARD

Mod 1 Tw lve Hundred S ries, Straight Eights, (1935)



BATTERY

Prest-O-Lite, A6-19-ST, 6 volts. Positive Terminal Grounded
Starting Capacity—175 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—6.2.
Lighting Capacity—7.5 amps. for 20 hours (150 amp. hour).
Box—Length, 13; width, 7; height, 9-3/16 inches.

STARTER

O-D Test No. 352 Rotation, L. H., Com. End
Owen-Dyneto, DN-1270
Connection to Engine—Bendix Drive, Type RCD10FXTD.
Running Free—73 amps. at 5.8 volts, 2900 R.P.M.
Cranking Engine—280 to 300 amps. at 4.9 volts.
Lock Torque—39 pound-feet, 810 amps. at 3.3 volts.
Brush Spring Tension—26 to 28 oz. on each (new brushes).
Starting Switch—"Startix", type F Red Seal, Automatic Starting Switch and Anti-Stall Device.
Armature—Owen-Dyneto, 13409.

IGNITION

D-R Test No. 1066 Rotation, R. H., Top View
Delco-Remy, 662-W
(Full Automatic Spark Advance)
Breakers—Contact separation .020 inch.
Cam Angles—Points closed 34 degrees; open 56 degrees (each breaker separately). Points closed 34 degrees; open 11 degrees (both operating).
Contact Spring Tension—19 to 23 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary.
Equal 45 degree intervals between interruptions.
Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke.
Stop when 6th graduation (standard head) or 4th graduation (high compression head) before mark "DC" on vibration dampener is under pointer on timing case.
With rotor under No. 1 Dist Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—14-MM (AC type K-7); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Automatic Advance—8% degrees (Distributor).
Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist.)
450 225 Start
1070 535 2
1700 850 4
2330 1165 6
3200 (Max.) 1600 8%
Ignition Coil—Delco-Remy, 539-K.
Ignition Switch and Cable—Delco-Remy, 430-L.
Ignition Lock Number—Briggs & Stratton 50184.
Ignition Key Series—Briggs & Stratton P551-P700.
Ignition Key Blank Number—Briggs & Stratton 52253.

GENERATOR

O-D Test No. 454 Rotation, L. H., Com. End

Owen-Dyneto, Type CO-1240, (Air Cooled)

IMPORTANT NOTE:—The drive end generator bearing is part of engine. Do not run unit in test bench until special Dyneto bearing is attached.

Performance Data—Gen. cold. Charge regulator closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.5	16	900	7.6
4	660	6.7	24	1100	8.
8	720	7.	30	1600 (Max.)	8.2

Motoring Freely—3½ amps. at 6 volts.

Max. Stall Current—36 amps. at 5.2 volts.

Field Test—2 to 2.3 amps. at 6 volts across field coils in series.

Field Fuse—3 amps. (type 1A-3), mounted in charge regulator.

Brush Spring Tension—Main brushes, 28 to 32 oz. Third, 16 to 18 oz. (new brushes).

Armature—Owen-Dyneto, 23704.

Third Brush Adjustment—Not necessary to loosen cover band.
Third brush position changed by turning adjusting screw in commutator end frame.

CHARGE REGULATOR AND RELAY

Owen-Dyneto, Type 40203

IMPORTANT.—This unit is designed for use with the new Red Seal type "F" Startix. An extra set of contacts are mounted on the cut-out armature which control a special resistance unit.

Relay Closes—6.7 to 6.9 volts.

Opens—0 to 3 amps. discharge.

Contact Gap—.030 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—R.B.M. Mfg. Co., Type 1402.

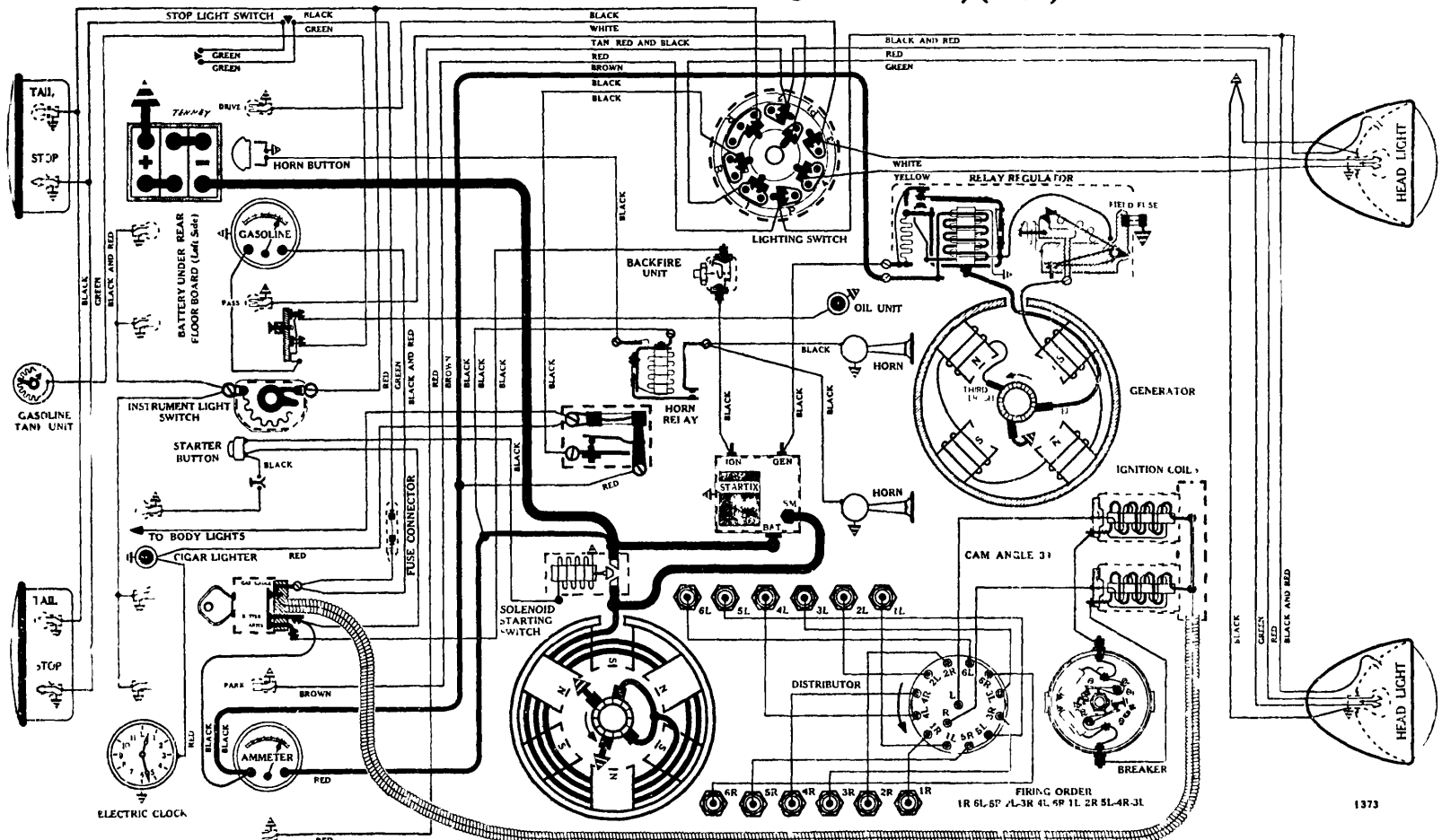
Location—Foot of steering column.

Fuses—Combination thermostatic relay and fuse block (Delco-Remy, 1050-W) mounted on steering post bracket behind instrument board. Relay in lighting circuits. Single 20 amp. fuse (type 5A-20) in cigar lighter and body light circuits. Single 20 amp. fuse (type 3A-20) in fuse connector behind instrument board on wire to stop light switch.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2330; PARK—55; INSTRUMENT—63; DOME—81; INDICATOR—55; STOP—87; TAIL—63.

PACKARD

M dels 1206, 1207, 1208, 67 Degre "V" 12, (1935)



BATTERY

Presto-O-Lite, A6-19-ST, 6 volts. Positive Terminal Grounded
Starting Capacity—175 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—6.2.
Lighting Capacity—7.5 amps. for 20 hours (150 amp. hour).
Box—Length, 13; width, 7; height, 9-3/16 inches.

STARTER

O-D Test No. 352 Rotation, L. H., Com. End
Owen-Dyneto, Type DN-1273
Connection to Engine—Bendix Drive, Type RCD10FXTD.
Running Free—73 amps. at 5.8 volts, 2900 R.P.M.
Cranking Engine—280 to 300 amps. at 4.9 volts.
Lock Torque—39 pound-feet, 810 amps. at 3.3 volts.
Brush Spring Tension—26 to 28 oz. on each (new brushes).
Starting Switch—"Startix", type F Red Seal, Automatic Starting Switch and Anti-Stall Device.
Armature—Owen-Dyneto, 13409.

IGNITION

A-L Test No. 407 Rotation, L. H., Top View
Auto-Lite, IGO-4002-A
(Full Automatic Spark Advance)

Breakers—Contact separation .018 inch on each.
Cam Angles—Points closed 39 degrees; open 21 degrees.
Contact Spring Tension—20 to 22 oz. on each.
Synchronizing—Unequal intervals of 33½-26½-33½, etc., degrees between interruptions.
Timing—With No. 1R piston on compression stroke, slowly turn engine until 6th graduation (standard head) or 4th graduation (high compression head) before mark "1R-UDC" on vibration dampener is under pointer on timing case. With rotor under No. 1R Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—14-MM (AC type K-7); Gap .025 to .030 inch.
Firing Order—1R-6L-5R-2L-3R-4L-6R-1L-2R-5L-4R-3L.
Automatic Advance—8 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
1050	525	2
1500	750	4
1950	975	6
2400 (Max.)	1200	8

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CE-4022 (Model 1207); CE-4023 (all others).

Ign. C il Only—A-L, CE-1203 on all.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-207 (Model 1207); CE-210 (all others).

Ignition Lock Number—Briggs & Stratton 50184.
Ignition Key Series—Briggs & Stratton P551-P700.
Ignition Key Blank Number—Briggs & Stratton 52253.

GENERATOR

O-D Test No. 454 Rotation, L. H., Com. End
Owen-Dyneto, Type CO-1271 (Belt Drive, Air Cooled)
Performance Data—Gen. cold. Charge regulator closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.5	16	900	7.6
4	660	6.7	24	1100	8.
8	720	7.	30	1600 (Max.)	8.2

Motoring Freely—3½ amps. at 6 volts.
Max. Stall Current—36 amps. at 5.2 volts.
Field Test—2 to 2.3 amps. at 6 volts across field coils in series.
Field Fuse—3 amps. (type 1A-3), mounted in charge regulator.
Brush Spring Tension—Main brushes, 28 to 32 oz. Third, 16 to 18 oz. (new brushes).
Armature—Owen-Dyneto, 23709.
Third Brush Adjustment—Not necessary to loosen cover band. Third brush position changed by turning adjusting screw in commutator end frame.

CHARGE REGULATOR AND RELAY

Owen-Dyneto, Type 40203

IMPORTANT:—This unit is designed for use with the new Red Seal type "F" Startix. An extra set of contacts are mounted on the cut out armature which control a special resistance unit.

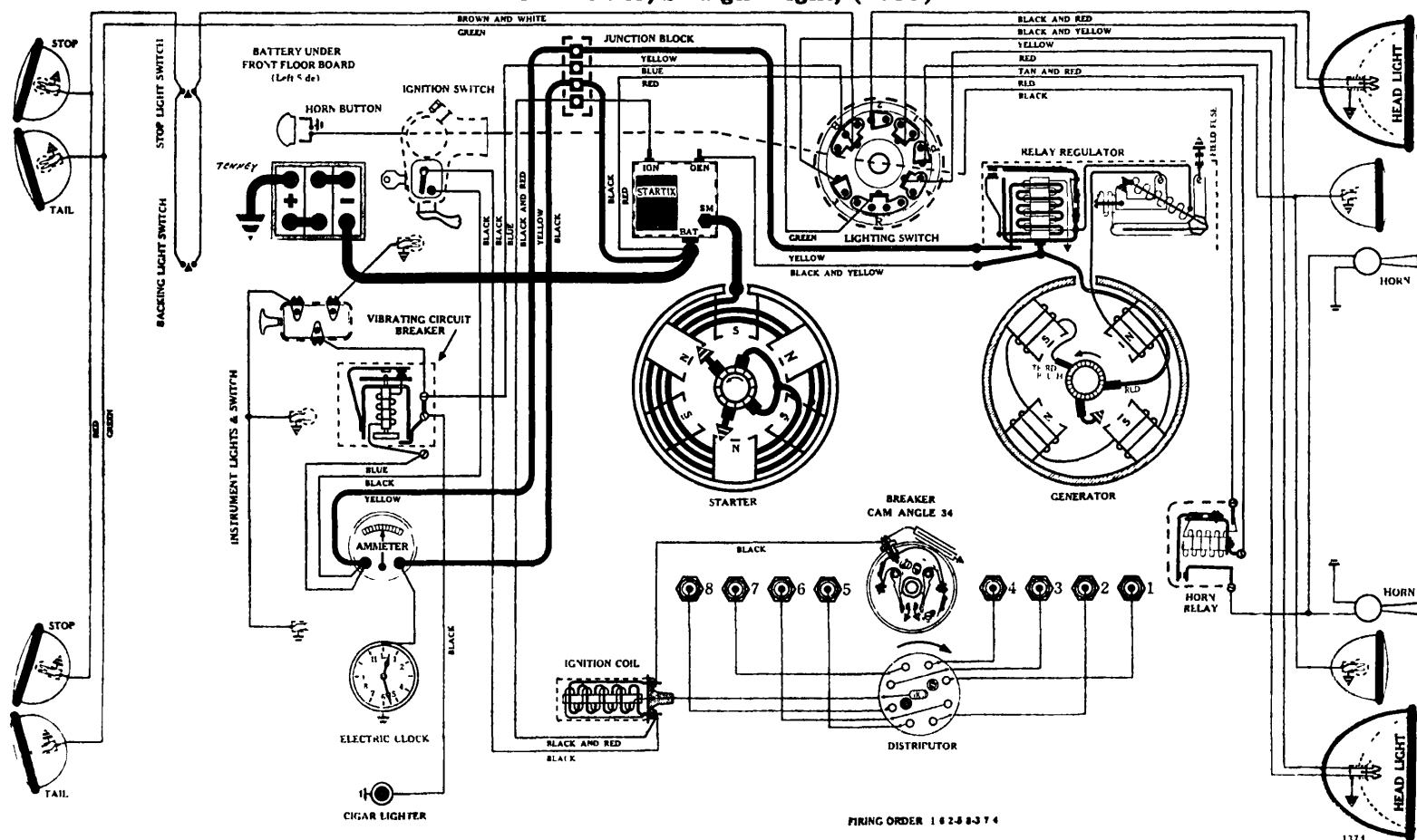
Relay Closes—6.7 to 6.9 volts.
Opens—0 to 3 amps. discharge.
Contact Gap—.030 inch.
Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—R.B.M. Mfg. Co., Type 1402.
Location—Foot of steering column.
Fuses—Combination thermostatic relay and fuse block (Delco-Remy, 1050-W) mounted on steering post bracket behind instrument board. Relay in lighting circuits. Single 20 amp. fuse (type 5A-20) in cigar lighter and body light circuits. Single 20 amp. fuse (type 3A-20) in fuse connector behind instrument board on wire to stop light switch.
Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2330; PARK—55; INSTRUMENT—63; DOME—81; INDICATOR—55; STOP—87; TAIL—63.

PIERCE - ARROW

Model 845, Straight Eight, (1935)



BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded

Starting Capacity—160 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—5.4.

Lighting Capacity—6.8 amps. for 20 hours (136 amp. hour).

Box—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

O-D Test No. 353 Rotation, L. H., Com. End
Owen-Dyneto, DI-1237

Connection to Engine—Bendix Drive, Type R11FSXT-10.

Running Free—60 amps. at 5.9 volts, 3000 R.P.M.

Cranking Engine—250 to 260 amps. at 4.6 volts.

Lock Torque—30 pound-feet, 750 amps. at 3.6 volts.

Brush Spring Tension—26 to 28 oz. on each (new brushes).

Starting Switch—"Startix," type D, Automatic Starting Switch and Anti-Stall Device.

Armature—Owen-Dyneto, 16437.

IGNITION

D-R Test No. 1005 Rotation, R. H., Top View
Delco-Remy, 662-J

Breakers—Contact separation .020 inch on each.

Cam Angles—Points closed 34 degrees; open 56 degrees (each breaker separately). Points closed 34 degrees; open 11 degrees (both working together).

Contact Spring Tension—17 to 21 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Equal 45 degree intervals between interruptions.

Timing—IMPORTANT! Time ignition in full advance position. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "Ign-1-8" (found 5 degrees or 1 1/2 flywheel teeth ahead of U.D.C. mark) is directly in line with pointer at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal stationary set of breaker points should just open.

Spark Plugs—14-MM (Champion type J-5); Gap .022 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—16 1/2 degrees (Distributor).

Automatic Advance—9 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
300	150		2
920	460		4
1550	775		7
2480	1240		9
3100 (Max.)	1550		

Ignition Coil—Delco-Remy, 537-E.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 300982.

GENERATOR

O-D Test No. 455 Rotation, L. H., Com. End

Owen-Dyneto, CO-1236 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Charge regulator closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	560	6.5	16	840	7.6
4	620	6.7	24	1040	8.
8	680	7.	32	1600 (Max.)	8.2

Motoring Freely—3 1/2 amps. at 6 volts.

Max. Stall Current—36 amps. at 5.2 volts.

Field Test—2 to 2.3 amps. at 6 volts across field coils in series.

Field Fuse—3 amps. (type 1A-3), mounted in charge regulator.

Brush Spring Tension—Main brushes, 28 to 32 oz. Third, 16 to 18 oz. (new brushes).

Armature—Owen-Dyneto, 23691.

Third Brush Adjustment—Not necessary to loosen cover band. Third brush position changed by turning adjusting screw in commutator end frame.

RELAY-REGULATOR

Owen-Dyneto, Type 21732

Relay Closes—6.7 to 6.9 volts.

Opens—0 to 3 amps. discharge.

Contact Gap—.030 inch.

Core Gap—.010 inch contacts closed.

LIGHTING

Switch—R.B.M. Mfg. Co., Type 1450.

Location—Foot of steering column.

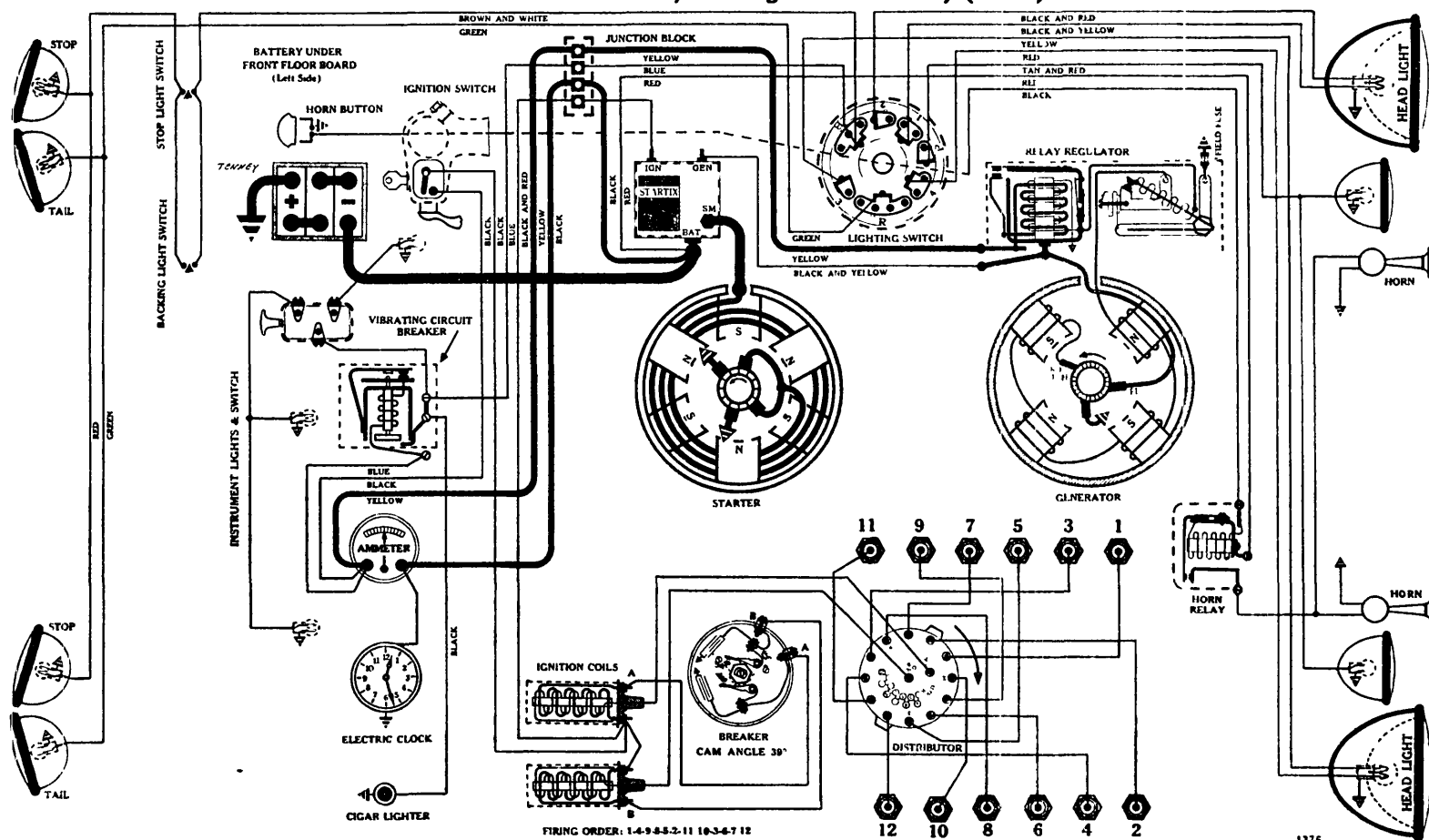
Vibrating Circuit Breaker—Delco-Remy, 410-F. Starts 30 to 35 amps. Operates 5 to 18 amps.

Horn Relay—Delco-Remy, 266-T.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—1000; PARK—81; INSTRUMENT—63; DOME—81; STOP AND BACKING—1129; TAIL—81.

PIERCE - ARROW

Models 1245 and 1255, 80 Degree "Ve" 12, (1935)



BATTERY

Willard, WH-5-19, 6 volts. Positive Terminal Grounded

Starting Capacity—180 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—6.6.

Lighting Capacity—7.6 amps. for 20 hours (153 amp. hour).

Box—Length, 13; width, 7-1/16; height, 9 3/4 inches.

STARTER

O-D Test No. 465 Rotation, L. H., Com. End

Owen-Dyneto, DY-1242

Connection to Engine—Bendix Drive, Type R11FSSXT-10.

Running Free—65 amps. at 5.8 volts, 3000 R.P.M.

Cranking Engine—260 to 275 amps. at 4.5 volts.

Lock Torque—29 1/2 pound-feet, 720 amps. at 3.4 volts.

Brush Spring Tension—26 to 28 oz. on each (new brushes).

Starting Switch—"Startix", type D, Automatic Starting Switch and

Anti-Stall Device.

Armature—Owen-Dyneto, 16489.

IGNITION

D-R Test No. 1010 Rotation, R. H., Top View

Delco-Remy, 4105

Breakers—Contact separation .018 inch on each.

Cam Angles—Points closed 39 degrees; open 21 degrees.

Contact Spring Tension—17 to 21 oz. on each.

Synchronizing—Movable points (which fire right bank) open 20 degrees after stationary. Unequal intervals of 20-40-20, etc., degrees between interruptions.

Timing—IMPORTANT! Time ignition in full advance position. Slowly turn engine until No. 1 piston (left bank) is coming up on compression stroke. Stop when flywheel mark "Ign 1" (which is 5 degrees ahead of mark "UDC-1") is directly in line with pointer at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—14-MM (Champion type J-5); Gap .022 to .025 inch.

Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.

NOTE: All odd cylinder numbers on left bank, No. 1 nearest radiator. All even numbers on right bank (see diagram).

Manual Advance—16 1/2 degrees (Distributor).

Automatic Advance—7 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
500	250	Start
800	400	1
1140	570	2
1800	900	4
2800 (Max.)	1400	7

Ignition Coils—Delco-Remy, 537-E.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 300982.

GENERATOR

O-D Test No. 455 Rotation, L. H., Com. End

Owen-Dyneto, CO-1236 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Charge regulator closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	560	6.5	16	840	7.6
4	620	6.7	24	1040	8.
8	680	7.	32	1600 (Max.)	8.2

Motoring Freely—3 1/2 amps. at 6 volts.

Max. Stall Current—36 amps. at 5.2 volts.

Field Test—2 to 2.3 amps. at 6 volts across field coils in series.

Field Fuse—3 amps. (type 1A-3), mounted in charge regulator.

Brush Spring Tension—Main brushes, 28 to 32 oz. Third, 16 to 18 oz. (new brushes).

Armature—Owen-Dyneto, 23691.

Third Brush Adjustment—Not necessary to loosen cover band.

Third brush position changed by turning adjusting screw in commutator end frame.

RELAY-REGULATOR

Owen-Dyneto, Type 21732

Relay Closes—6.7 to 6.9 volts.

Opens—0 to 3 amps. discharge.

Contact Gap—.030 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—R.B.M. Mfg. Co., Type 1450.

Location—Foot of steering column.

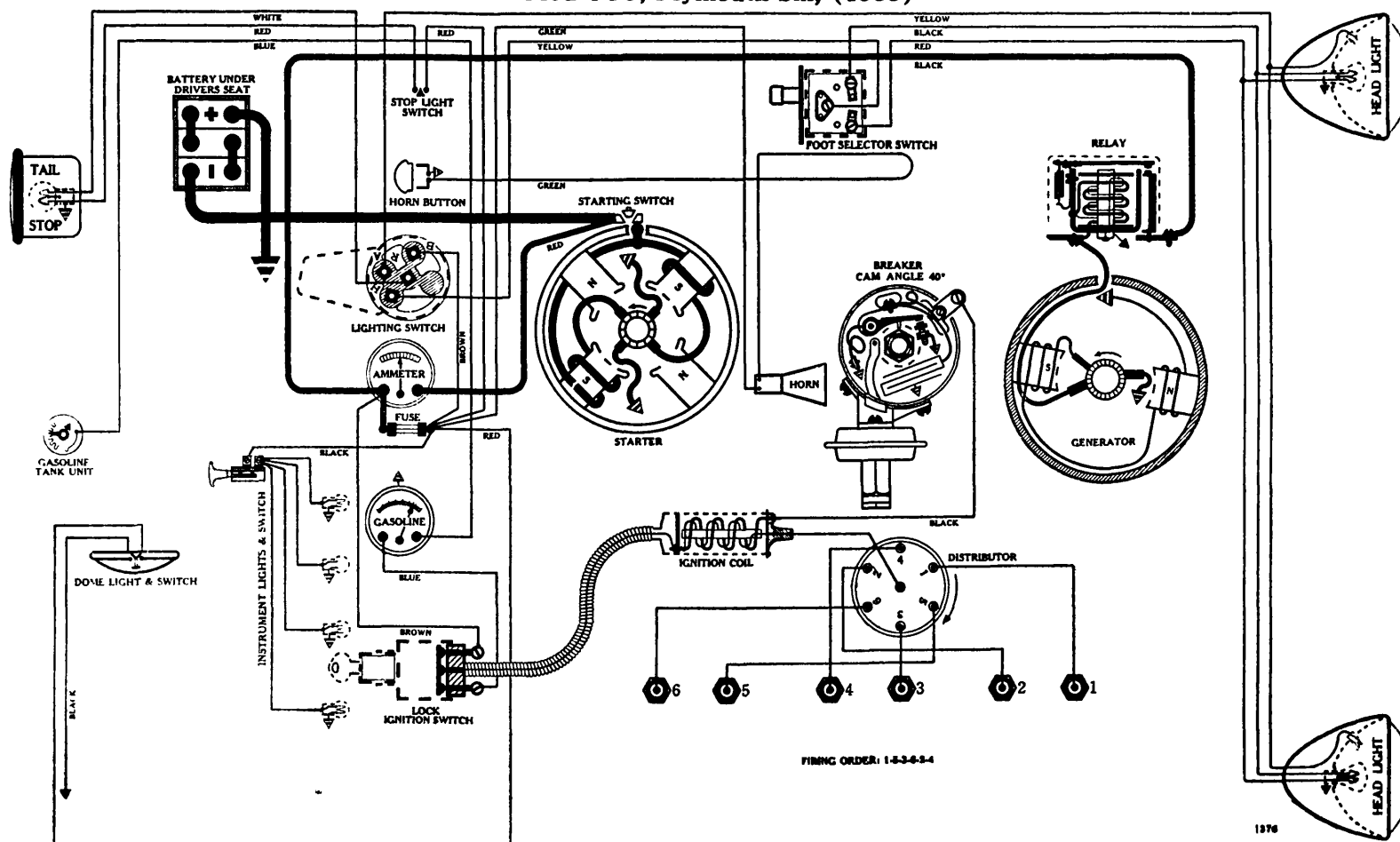
Vibrating Circuit Breaker—Delco-Remy, 410-F. Starts 80 to 35 amps. Operates 5 to 18 amps.

Horn Relay—Delco-Remy, 266-T.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—1000; PARK—81; INSTRUMENT—63; DOME—81; STOP AND BACKING—1129; TAIL—81.

PLYMOUTH

Mod 1 PJ, Plymouth Six, (1935)



BATTERY

Willard, WS-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—105 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—2.3.

Lighting Capacity—4.3 amps. for 20 hours (86 amp. hour).

Box—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAW-4002

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion & Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5½ volts, 4900 R.P.M.

Cranking Engine—150 to 160 amps. at 5.1 volts.

Lock Torque—12 pound-feet, 505 amps. at 3 volts.

Brush Spring Tension—31 to 42 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-2677-A.

Armature—Auto-Lite, MAW-2030.

IGNITION

A-L Test No. 418 Rotation, R. H., Top View
Auto-Lite, IGS-4003

(Full Automatic Spark Advance in conjunction with Auto-Lite IGS-1023-S Vacuum Advance Unit, which controls position of Breaker Plate.)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 40 degrees; open 20 degrees.

Contact Spring Tension—17 to 19 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "zero" mark on fan pulley (which is exact T.D.C.) has moved 4 graduations past the pointer on gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-9); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance—11 degrees (Distributor). Starts with vacuum of from 4 to 5 inches of mercury. Requires vacuum of 18 inches for full travel.

Automatic Advance—11 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
700	350		
800 (Intermediate)	400		3
1400	700		5
2300	1150		8
3200 (Max.)	1600		11

Ign. Coil, Lock Switch & Cable Assembly Complete—A-L, IG-4610.

Ign. Coil Only—A-L, IG-3224-S.

Ign. Switch & Cable Assembly Less Lock—A-L, CE-1187-TS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBM-4603-1 (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	12	1350	7.5
4	900	6.8	16	1740	7.8
8	1125	7.2	18	2200 (Max.)	8.0

Motoring Freely—5.3 to 5.8 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5½ volts.

Field Test—3.8 to 4.2 amps. at 6 volts across field coils in series.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GBM-2006-F.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014

Closes—6½ to 7½ volts.

Opens—½ to 2½ amps discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Douglas, No. 5374.

Location—Behind instrument board.

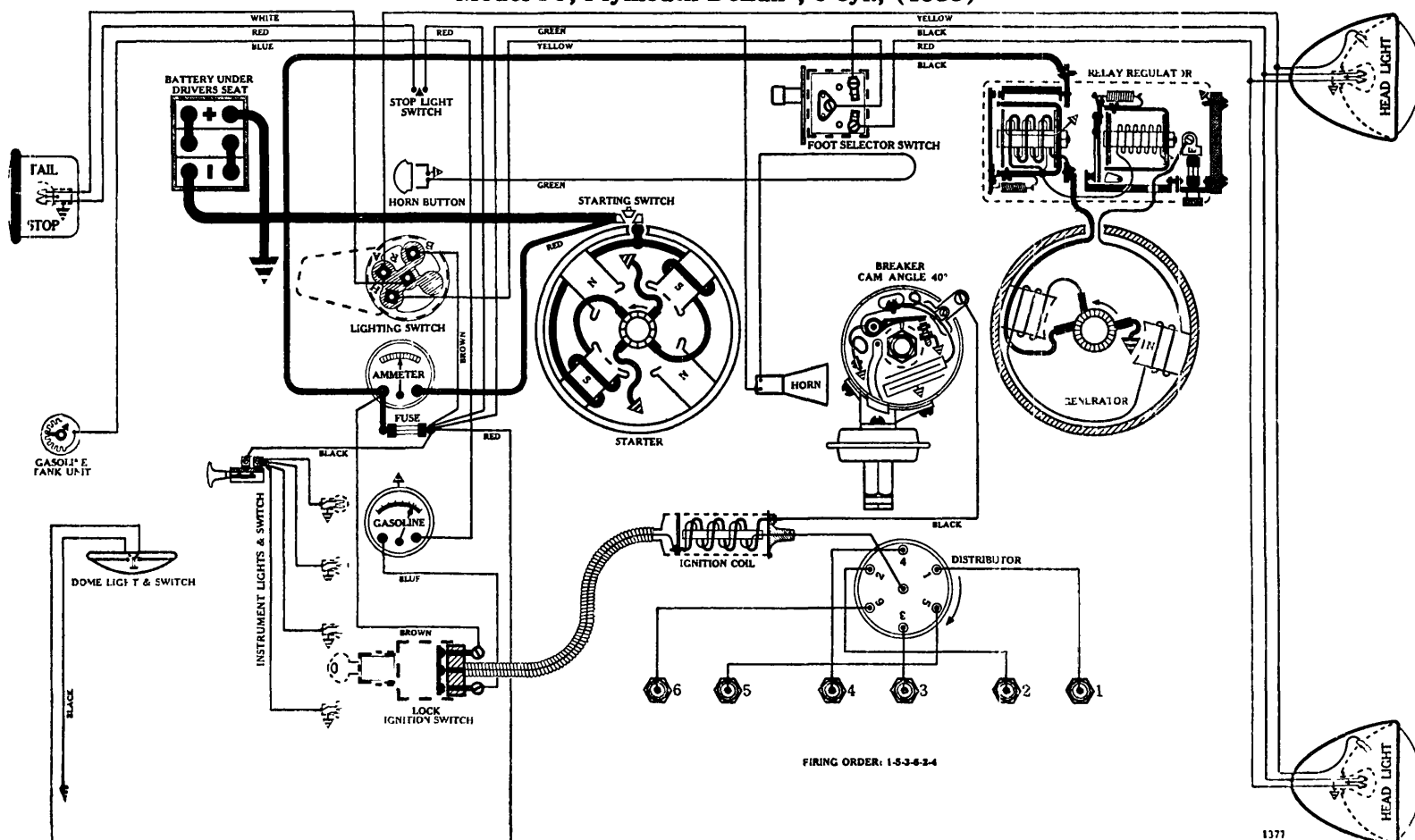
Fuses—(Lighting) Single 20 amp. fuse (type 3A-20), mounted on back of ammeter. (If dual horns), 20 amp. (type 3A-20) in fuse connector on wire close to starting motor.

Foot Selector Switch—Clum, No. 9579.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; INSTRUMENT—63; IGN. SWITCH LIGHT—55; SPEEDOMETER LIGHT—63; DOME—87; STOP AND TAIL—1158.

PLYMOUTH

Model PJ, Plymouth DeLux, 6 cyl., (1935)



BATTERY

Willard, WT-1-15, 6 volts. Positive Terminal Grounded
Starting Capacity—117 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.
Lighting Capacity—4.5 amps. for 20 hours (90 amp. hour).
Box—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAW-4002

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion & Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5½ volts, 4900 R.P.M.

Cranking Engine—150 to 160 amps. at 5.1 volts.

Lock Torque—12 pound-feet, 505 amps. at 3 volts.

Brush Spring Tension—31 to 42 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-2677-A.

Armature—Auto-Lite, MAW-2030.

IGNITION

A-L Test No. 418 Rotation, R. H., Top View
Auto-Lite, IGS-4303

(Full Automatic Spark Advance in conjunction with Auto-Lite IGS-1023-S Vacuum Advance Unit, which controls position of Breaker Plate.)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 40 degrees; open 20 degrees.

Contact Spring Tension—17 to 19 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "zero" mark on fan pulley (which is exact T.D.C.) has moved 4 graduations past the pointer on gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-9); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance—11 degrees (Distributor). Starts with vacuum of from 4 to 5 inches of mercury. Requires vacuum of 18 inches for full travel.

Automatic Advance—11 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
700	350		
800 (Intermediate)	400		3
1400	700		5
2300	1150		8
3200 (Max.)	1600		11

Ign. Coil, Lock Switch & Cable Assembly Complete—A-L, IG-4610.

Ign. Coil Only—A-L, IG-3224-S.

Ign. Switch & Cable Assembly Less Lock—A-L, CE-1187-TS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4608-5 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	12	1275	7.4
4	875	6.8	16	1600	7.8
8	1075	7.	21	2400 (Max.)	8.1

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.

Field Fuse—5 amp. (type 1A-5) in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116-F.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4301-A

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.5 to 7.3 volts (hot or cold).

Opens—0 to 3 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

Regulator—

Contact Spring Tension—10 to 12 oz.

Points Open—8.3 volts.

Points Close—7.2 volts.

Contact Opening—.005 inch (minimum).

Core Gap—.020 inch (contacts closed).

LIGHTING

Switch—Douglas, No. 5374.

Location—Behind instrument board.

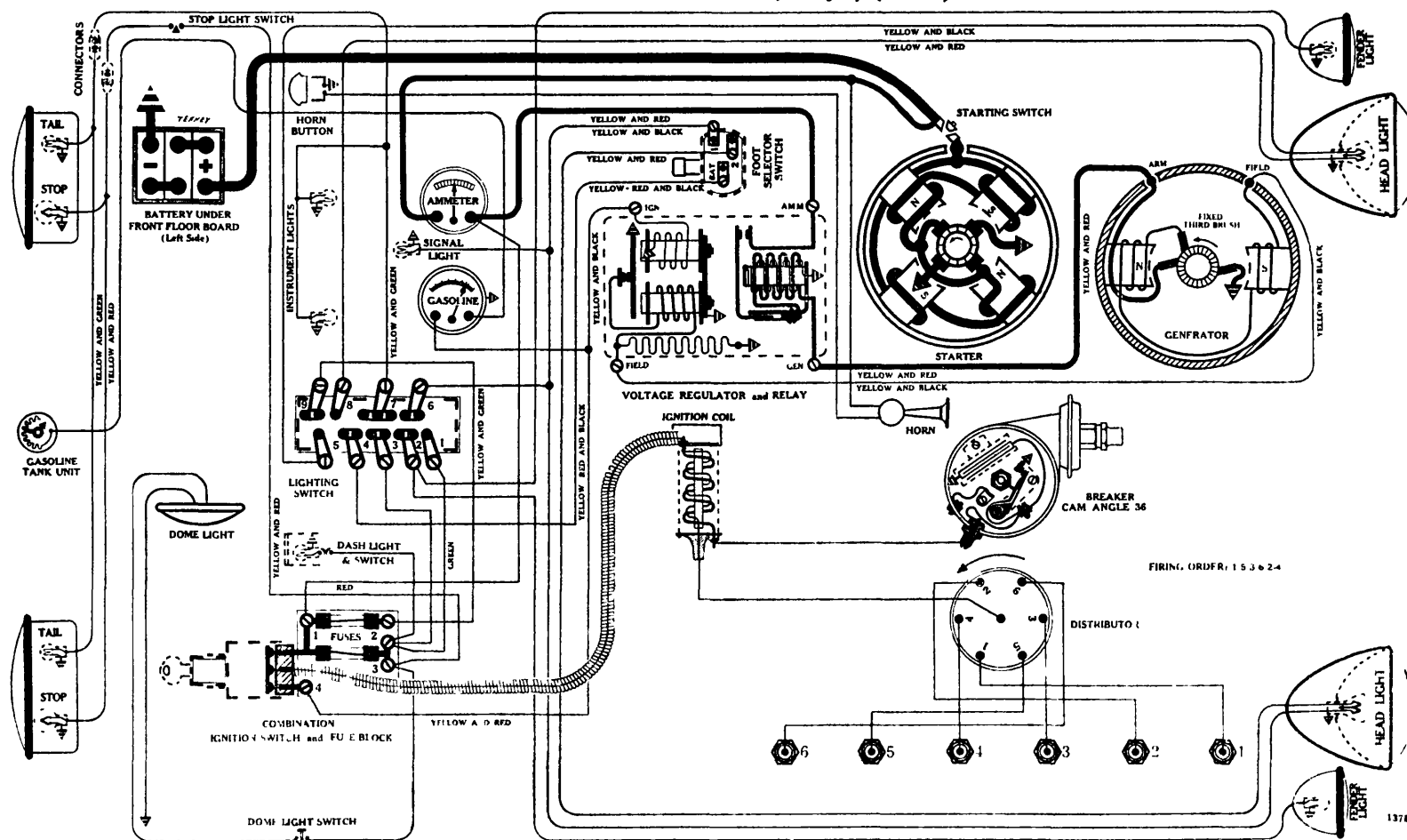
Fuses—(Lighting) Single 20 amp. fuse (type 3A-20), mounted on back of ammeter. (If dual horns), 20 amp. (type 3A-20) in fuse connector on wire close to starting motor.

Foot Selector Switch—Clum, No. 9579.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; INSTRUMENT—63; IGN. SWITCH LIGHT—55; SPEEDOMETER LIGHT—63; DOME—87; STOP AND TAIL—1158.

PONTIAC

Models 701-A and 701-B, 6 cyl., (1935)



BATTERY

Delco-Remy, 15-T, 6 volts. Negative Terminal Grounded
Starting Capacity—115 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—2.75.
Lighting Capacity—4.7 amps. for 20 hours (94 amp. hour).
Box—Length, 9-1/16; width, 7; height, 8 5/8 inches.

STARTER

D-R Test No. 395 Rotation, L. H., Com. End
Delco-Remy, 727-T

Connection to Engine—Mechanical gear shift, incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Starter Pinion and Clutch Assembly—Delco-Remy, 1856669.

Running Free—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—250 to 260 amps. at 5.5 volts.

Lock Torque—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test No. 1069 Rotation, L. H., Top View
Delco-Remy, 647-A

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-U Vacuum Advance Unit, which controls position of Breaker Plate.)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 36 degrees; open 24 degrees.

Contact Spring Tension—17 to 21 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when first flywheel mark "IGN 1 & 6" is in line with pointer on flywheel housing. (NOTE: There are two marks "IGN 1 & 6" on flywheel. The first mark is 6 degrees before T.D.C., and the second mark 2 degrees before T.D.C. The recommended setting is by the first mark, to compensate for wear.) With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-7); Gap .025 inch.

Gap .022 inch on cars with radio.

Firing Order—1-5-3-6-2-4.

Vacuum Advance—7 1/2 degrees (Distributor). Starts with vacuum of from 9 to 11 inches of mercury. Requires vacuum of from 16 to 18 inches for full travel.

Automatic Advance—11 degrees (Distributor)

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
330	165		3
1020	510		5 1/2
1600 (Intermediate)	800		9
3000	1500		11
3800 (Max.)	1900		

Ignition Coil—Delco-Remy, 539-L.

Ignition Switch and Cable—Delco-Remy, 431-L.

Ignition Lock Number—Briggs & Stratton 45792.

Ignition Key Series—Briggs & Stratton 8000-9499.

Ignition Key Blank Number—Briggs & Stratton 82078.

GENERATOR

D-R Test No. 1271 Rotation, L. H., Com. End
Delco-Remy, 935-W (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	12	1350	7.7
4	900	6.9	16	1750	8.1
8	1100	7.3	22	3300 (Max.)	8.5

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5 1/2 volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Charging Adjustment—Fixed third brush. External vibrating point voltage regulation.

RELAY-REGULATOR

D-R Test No. 1294 Delco-Remy, 5588

A combination of Cut-Out Relay and Vibrating Point Voltage Regulator.

Cut-Out Relay—Closes—6.5 to 7.25 volts.

Opens—0 to 3 amps. discharge at 6.3 volts.

Contact Gap—.018 to .025 inch.

Core Gap—.018 to .022 inch, contacts closed.

Contact Spring Tension—2.7 to 3.5 oz.

Gap Between Fiber Bumper and Contact Spring

Stop—.008 to .013 inches, (armature up).

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature all way down).

Voltage Setting—Unit operates at 7.7 to 8.0 volts with 8 to 10 amp. charging rate, 70 degrees F.

LIGHTING

Switch—Delco-Remy, 479-Z (Model 701-A).

Delco-Remy, 479-S (Model 701-B).

Location—Behind instrument board.

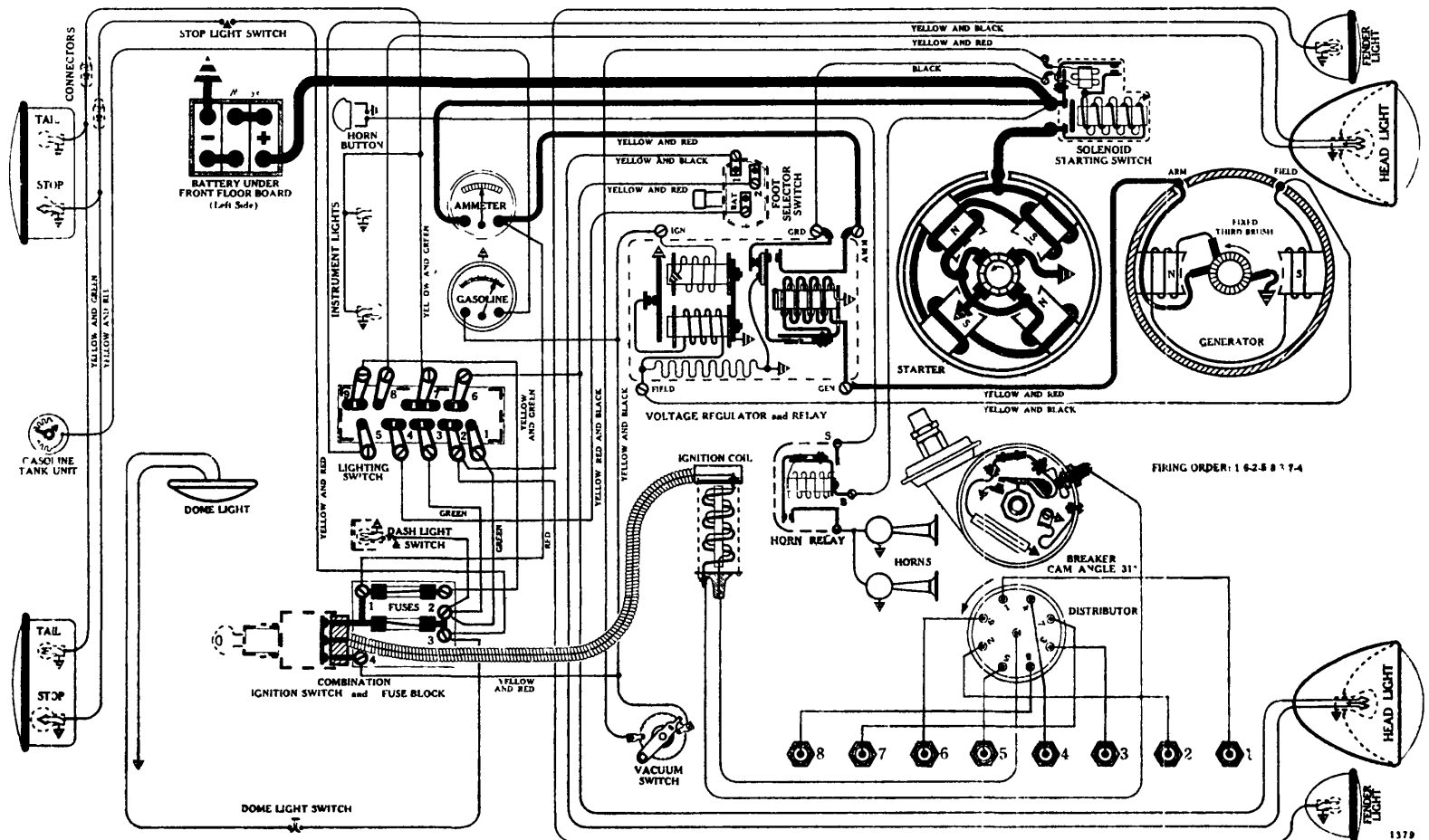
Fuses—Two 20 amp. fuses (type 3A-20) with spare on Delco-Remy fuse block No. 1050-X, found just below lock ignition switch (behind instrument board). Outside live fuse, left head light only. Other fuse, all other units.

Foot Selector Switch—Delco-Remy, 465-V.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—63; INSTRUMENT—51; INDICATOR—51; DOME—81; STOP—87; TAIL—68.

PONTIAC

Model 605, Straight Eight, (1935)



BATTERY

Delco-Remy, 17-K, 6 volts. Negative Terminal Grounded
Starting Capacity—131 amps. for 20 minutes.
Minutes of Discharge at 300 amps., Zero Degrees F.—3.25.
Lighting Capacity—5.5 amps. for 20 hours (110 amp. hour).
Box—Length, 10%; width, 7; height, 8% inches.

D-R Test No. 395

STARTER

Rotation, L. H., Com. End Delco-Remy, 727-S

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch, remote control relay (located in solenoid unit), and an auxiliary set of grounding points found on cut-out relay, (located in regulator unit).

Starter Pinion and Clutch Assembly—Delco-Remy, 1856669.

Running Free—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—250 to 260 amps. at 5.5 volts.

Lock Torque—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1516.

Vacuum Starting Control Switch—Delco-Remy, 1588.

Armature—Delco-Remy, 823881.

D-R Test No. 882

IGNITION

Rotation, L. H., Top View Delco-Remy, 663-B

(Full Automatic Spark Advance in conjunction with Delco-Remy, 680-K Vacuum Advance Unit, which controls position of Breaker Plate.)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when first flywheel mark "IGN-1 & 8" is in line with pointer on flywheel housing. (NOTE: There are two marks "IGN-1 & 8" on flywheel. The first mark is 6 degrees before T.D.C., and the second mark 2 degrees before T.D.C. The recommended setting is by the first mark, to compensate for wear.) With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-7); Gap .025 inch. Gap .022 inch on cars with radio.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance—10 degrees (Distributor). Starts with vacuum of from 4 to 6 inches of mercury. Requires vacuum of from 16 to 21 inches for full travel.

Automatic Advance—11 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
360	180	Start
690	345	2
1200 (Intermediate)	600	5
2300	1150	8
3400 (Max.)	1700	11

Ignition Coil—Delco-Remy, 539-L.

Ignition Switch and Cable—Delco-Remy, 431-L.

Ignition Lock Number—Briggs and Stratton 45792.

Ignition Key Series—Briggs & Stratton 8000-9499.

Ignition Key Blank Number—Briggs & Stratton 82078.

GENERATOR

D-R Test No. 1271 Rotation, L. H., Com. End

Delco-Remy, 935-W (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	12	1850	7.7
4	900	6.9	16	1750	8.1
8	1100	7.3	22	3300 (Max.)	8.5

Motoring Freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5½ volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Charging Adjustment—Fixed third brush. External vibrating point voltage regulation.

RELAY-REGULATOR

D-R Test No. 1294 Delco-Remy, 5557

A combination of Cut-Out Relay and Vibrating Voltage Regulator

Cut-Out Relay—Closes—6.5 to 7.25 volts.

Opens—0 to 3 amps. discharge at 6.3 volts.

Contact Gap—.018 to .025 inch.

Core Gap—.018 to .022 inch, contacts closed.

Contact Spring Tension—2.7 to 3.5 oz.

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches, (armature up).

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature all way down).

Voltage Setting—Unit operates at 7.7 to 8.0 volts (with 8 to 10 amp. charging rate), 70 degrees F.

Solenoid Relay (Located in Solenoid Unit):

Closes—3.6 to 4 volts (max.).

Opens—1.6 to 2. volts.

Opens—1.6 to 2. volts.

Contact Gap—.030 to .045 inch.

Core Gap—.010 to .014 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 479-Z.

Location—Behind instrument board.

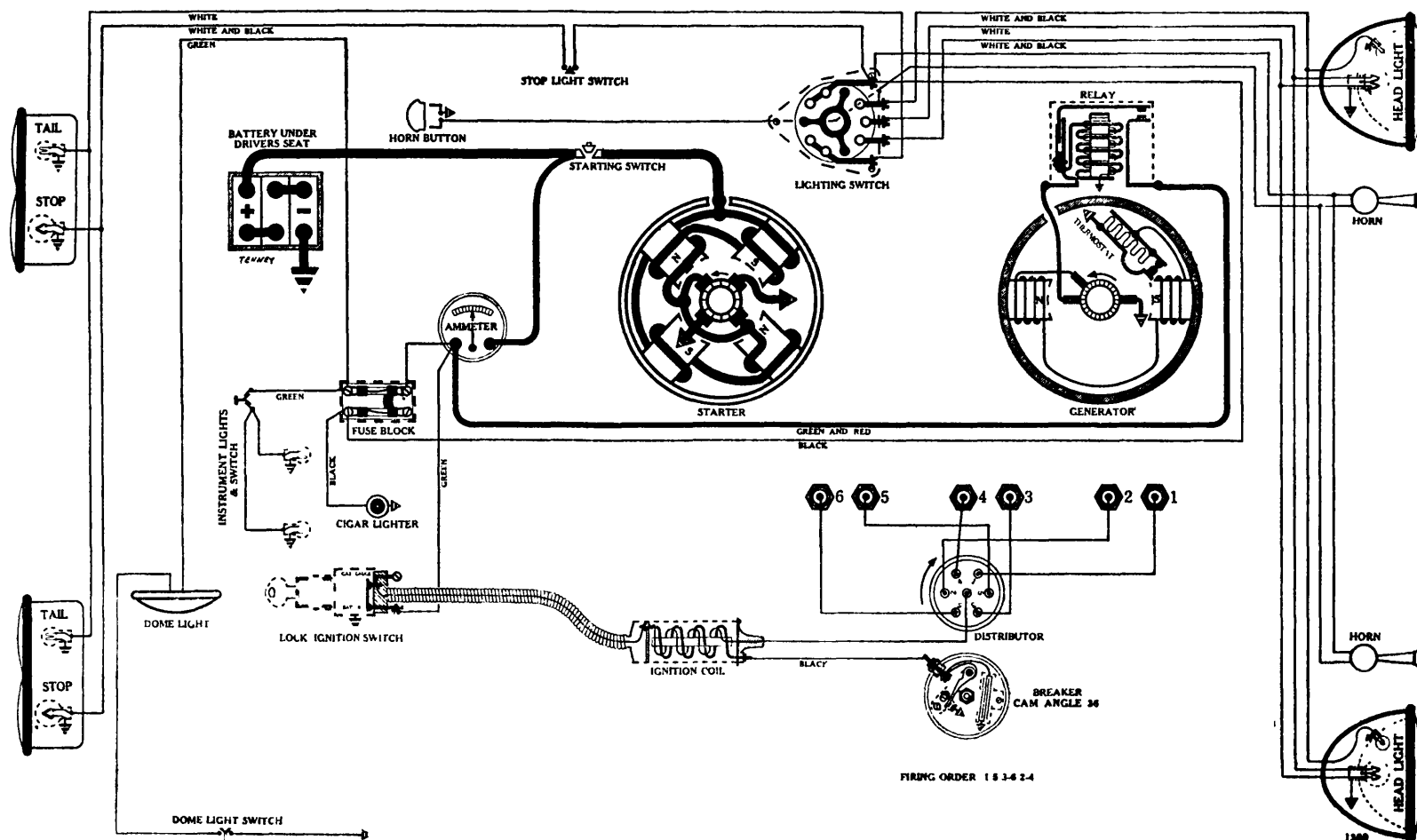
Fuses—Two 20 amp. fuses (type 3A-20) with spare on Delco-Remy fuse block No. 1050-X, found just below lock ignition switch (behind instrument board). Outside live fuse, left head light only. Other fuse, all other units.

Foot Selector Switch—Delco-Remy, 465-V.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—63; INSTRUMENT—51; DOME—81; STOP—87; TAIL—63.

REO

Mod 17S-35, 6 cyl., (1935)



BATTERY

Willard, WH-1-13, 6 volts. Negative Terminal Grounded
Starting Capacity—120 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1.
Lighting Capacity—5.1 amps. for 20 hours (102 amp. hour).
Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

D-R Test No. 407 Rotation, L. H., Com. End
Delco-Remy, 736-G
Connection to Engine—Bendix Drive, Type RCD11FX-10.
Running Free—65 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—175 to 185 amps. at 4.8 volts.
Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
Brush Spring Tension—32 to 36 oz. on each (new brushes).
Starting Switch—Delco-Remy, 405-C (Clutch pedal operated).
Armature—Delco-Remy, 818002.

IGNITION

D-R Test No. 1025 Rotation, R. H., Top View
Delco-Remy, 644-M
(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 36 degrees; open 24 degrees.
Contact Spring Tension—17 to 21 oz.
Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the line on flywheel (found 3/4 inch or 2 full teeth ahead of flywheel mark "UDC") is opposite reference line on flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—18-MM (Champion type 7); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Automatic Advance—9 degrees (Distributor).
Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist.)
320 160 Start
890 445 2
1460 730 4
2040 1020 6
2900 (Max.) 1450 9
Ignition Coil—Delco-Remy, 538-B.
Ignition Switch & Cable—Delco-Remy, 430-C.

GENERATOR

D-R Test No. 302 Rotation, L. H., Com. End
Delco-Remy, 955-R, (Belt Drive)

Performance Data—Gen. cold. Thermostat closed.					
Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	575	6.5	11	1000	7.9
3	700	7.	15	1200	8.1
6	800	7.1	20	1450 (Max.)	8.3

NOTE—Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—5 to 5½ amps. at 6 volts.
Max. Stall Current—18 to 20 amps. at 6 volts.
Field Test—4 amps. at 6 volts across field coils in series.
Brush Spring Tension—14 to 18 oz. on each (new brushes).
Armature—Delco-Remy, 817807.

Third Brush Adjustment—Loosen cover band. Loosen third brush adjustment lock screw on outside of commutator end frame. Shift third brush by hand. Relock.

RELAY

Delco-Remy, 265-G

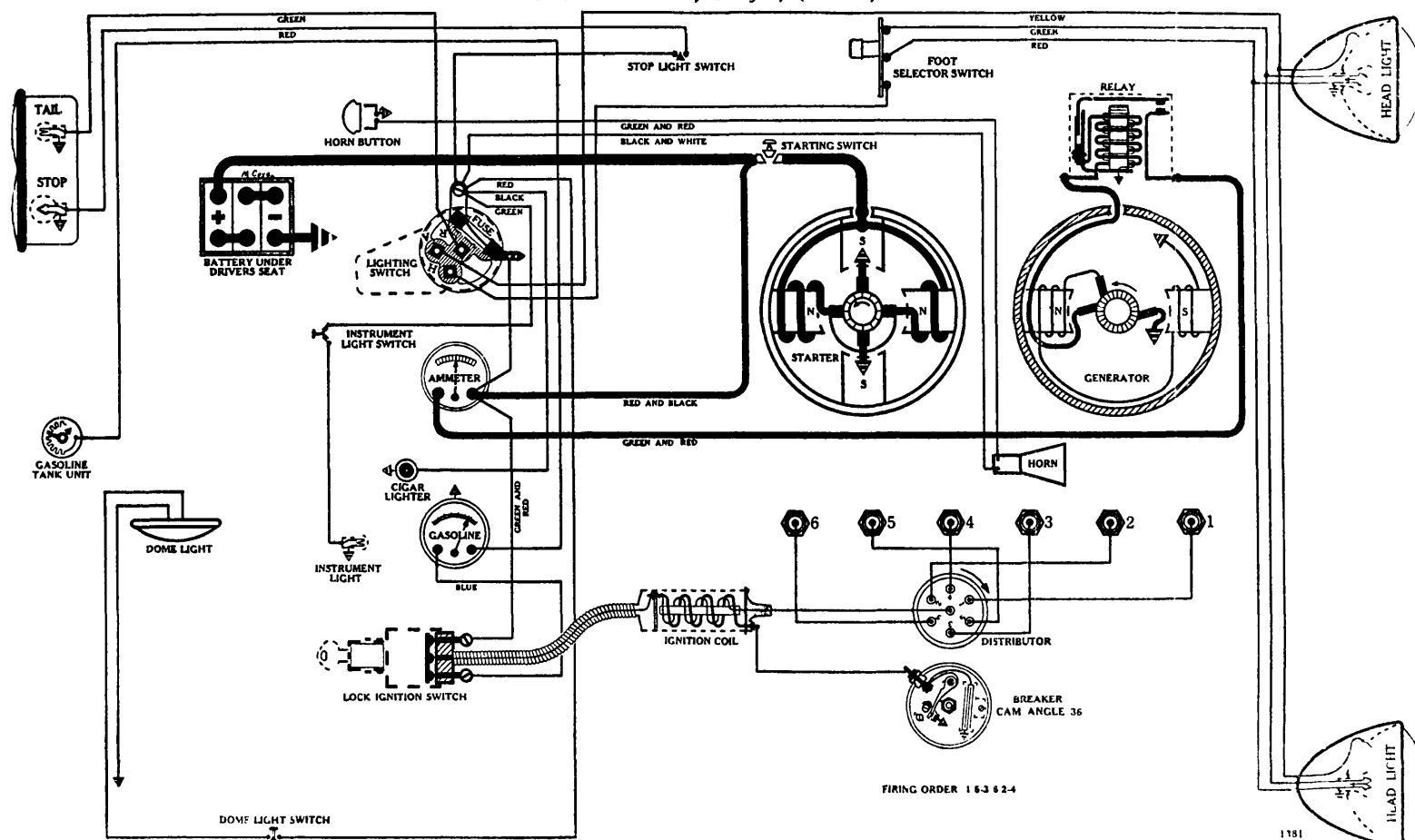
Closes—6½ to 7½ volts.
Opens—0 to 2½ amps. discharge.
Contact Gap—.015 to .025 inch.
Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 486-X.
Location—Foot of steering column.
Fuses—Two 20 amp. fuses (type 3A-20), mounted on fuse block behind instrument board.
Lamps—Refer to "Lamp Data" in Technical Section. HEAD—1116; PARK—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

REO

Model 6A-35, 6 cyl., (1935)



BATTERY

Willard, WH-1-13, 6 volts. Negative Terminal Grounded
 Starting Capacity—120 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1.
 Lighting Capacity—5.1 amps. for 20 hours (102 amp. hour).
 Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

D-R Test No. 368 Rotation, L. H., Com. End
 Delco-Remy, 738-K

Connection to Engine—Bendix Drive, Type A-1718.
 Running Free—65 amps. at 5 volts, 5000 R.P.M.
 Cranking Engine—150 to 160 amps. at 5.2 volts.
 Lock Torque—12 pound-feet, 475 amps. at 3.6 volts.
 Brush Spring Tension—24 to 28 oz. on each (new brushes).
 Starting Switch—Delco-Remy, 405-C.
 Armature—Delco-Remy, 1847432.

IGNITION

D-R Test No. 1075 Rotation, R. H., Top View
 Delco-Remy, 645-K
 (Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
 Cam Angles—Points closed 36 degrees; open 24 degrees.
 Contact Spring Tension—17 to 21 oz.
 Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the line on flywheel (found 3/4 inches or 1 1/2 teeth ahead of flywheel mark "UDC") is opposite reference line on flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
 Spark Plugs—18-MM (Champion type 7); Gap .025 inch.
 Firing Order—1-5-3-6-2-4.
 Automatic Advance—6 degrees (Distributor)

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
890	445	1
1170	585	2
1450	725	3
1600 (Intermediate)	800	3 1/2
1910	955	4
2540	1270	5
3200 (Max.)	1600	6

Ignition Coil—Delco-Remy, 536-G.
 Ignition Switch & Cable—Delco-Remy, 431-W.

GENERATOR

D-R Test No. 278-A Rotation, L. H., Com. End
 Delco-Remy, 937-Z (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	10	1020	7.5
2	760	6.7	14	1270	7.9
6	860	7.1	18	2000 (Max.)	8.3

Motoring Freely—3 1/2 to 4 amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 6 volts.

Field Test—3 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—23 to 27 oz. on each (new brushes).

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAY

Delco-Remy, 265-H

Closes—6 1/2 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switches—H. A. Douglas Co., No. 5400 (without fuse on switch back. Used on radio installations in conjunction with a fuse block.) H. A. Douglas Co., No. 5399 (with fuse on back).

Location—Behind instrument board.

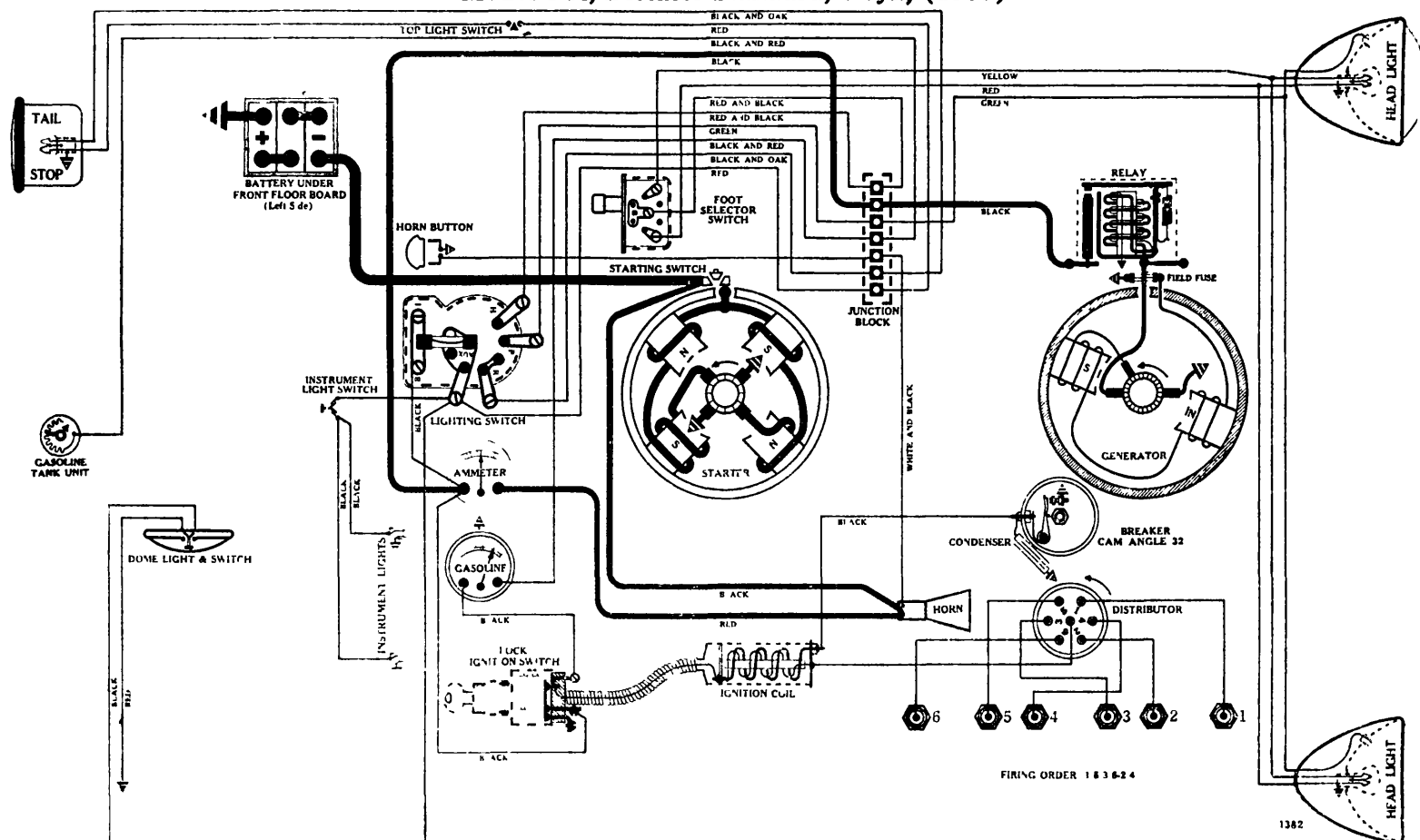
Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back, or two 20 amp. fuses on block behind instrument board.

Foot Selector Switch—H. A. Douglas Co. No. 5398.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

STUDEBAKER

Model 1-A, Dictator Standard, 6 cyl., (1935)



BATTERY

Willard, WH-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1.

Lighting Capacity—5.1 amps. for 20 hours (102 amp. hour).

Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite, MAN-4005

Connection to Engine—Bendix Drive, Type RCD10FXD-9.

Running Free—65 amps. at 5½ volts, 4000 R.P.M.

Cranking Engine—200 to 220 amps. at 4.9 volts.

Lock Torque—15 pound-feet, 580 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-3737-S, mounted on starter. Switch should not close with less than 2.3 lbs. pull applied at right angles to hole in extreme end of lever.

Armature—Auto-Lite, MAD-2083.

IGNITION

A-L Test No. 363 Rotation, L. H., Top View

Auto-Lite, IGB-4393

(Full Automatic Spark Advance in conjunction with Auto-Lite, Type VC-4001 Vacuum Spark Control.)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 32 degrees; open 28 degrees.

Contact Spring Tension—17 to 19 oz.

Timing—With No. 1 piston on compression stroke, bring flywheel mark "UDC 1-6" directly in line with pointer in flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type 8); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance—7½ degrees (Distributor).

Automatic Advance—10½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
800	400	Start
1000	500	2
1400 (Intermediate)	700	6
2340	1170	9
2800 (Max.)	1400	10½

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4607.

Ign. Coil Only—A-L, IG-3033-RS.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-JAS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBM-4604-2 (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	685	6.5	12	1350	7.5
4	850	6.7	16	1900	7.8
8	1020	7.2	18	2400 (Max.)	8.

Motoring Freely—4½ to 5 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 6 volts.

Field Test—3.8 to 4.2 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5).

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GBM-2006.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

Closes—6¼ to 7½ volts.

Opens—½ to 2½ amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Clum, No. 9582.

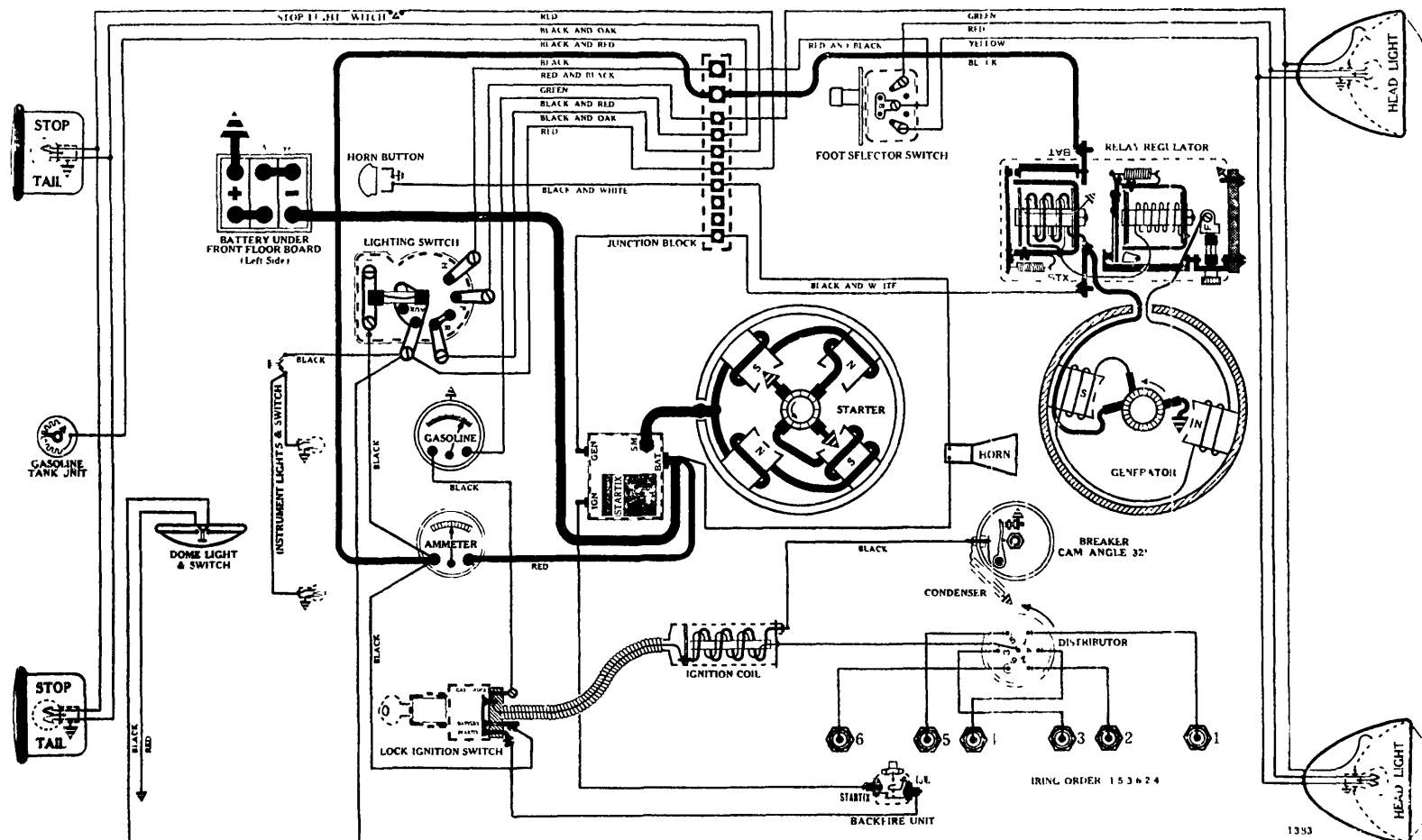
Location—Behind instrument board.

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch.

Foot Selector Switch—Clum, No. 9584.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

Model 2-A, Dictator DeLuxe, 6 cyl., (1935)



Willard. WH-1-13. 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1.
Lighting Capacity—5.1 amps. for 20 hours (102 amp. hour).
Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

**Rotation, L. H., Com. End
Auto-Lite, MAN-4002**

Connection to Engine—Bendix Drive, Type RCD10FXD-9.
Running Free—65 amps. at 5½ volts, 4000 R.P.M.
Cranking Engine—200 to 220 amps. at 4.9 volts.
Lock Torque—15 pound-feet, 580 amps. at 3 volts.
Brush Spring Tension—44 to 56 oz. on each (new brushes).
Starting Switch—"Startix", type D, Automatic Starting Switch and
 Anti-Stall Device.
Armature—Auto-Lite, MAD-2083.

A-L Test No. 363 **Rotation, L. H., Top View**
Auto-Lite, IGB-4393

**(Full Automatic Spark Advance in conjunction with Auto-Lite,
Type VC-4001 Vacuum Spark Control.)**

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 32 degrees; open 28 degrees.
Contact Spring Tension—17 to 19 oz.
Timing—With No. 1 piston on compression stroke, bring flywheel mark "UDC 1-6" directly in line with pointer in flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—18-MM (Champion type 8); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Vacuum Advance—7½ degrees (Distributor).
Automatic Advance—10½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
800	400	Start
1000	500	2
1400 (Intermediate)	700	6
2340	1170	9
2800 (Max.)	1400	10½

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4302-A.
Ign. Coil Only—A-L, IG-3033-BS.
Ign. Switch and Cable Assembly Less Lock—A-L, CE-1047-S.

Rotation, L. H., Com. End
Auto-Lite, GAR-4609-5

(Special High Output Generator, Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.6	12	1150	7.5
2	750	6.7	16	1400	7.9
4	850	6.9	20	1700	8.2
6	875	7.	21½	2000	8.3
8	950	7.1	22	2200 (Max.)	8.4

Running Free—4½ to 5½ amps. at 6 volts.
Max. Stall Current—26 to 28 amps. at 5.6 volts.
Field Test—3.7 to 4.1 amps. at 6 volts across field coils in series.
Field Fuse—5 amp. (type 1A-5) in regulator unit.
Brush Spring Tension—3½ oz. Max. on each (new brushes).
Armature—Auto-Lite, GAR-2116.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

Auto-Lite, TC-4302-A

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

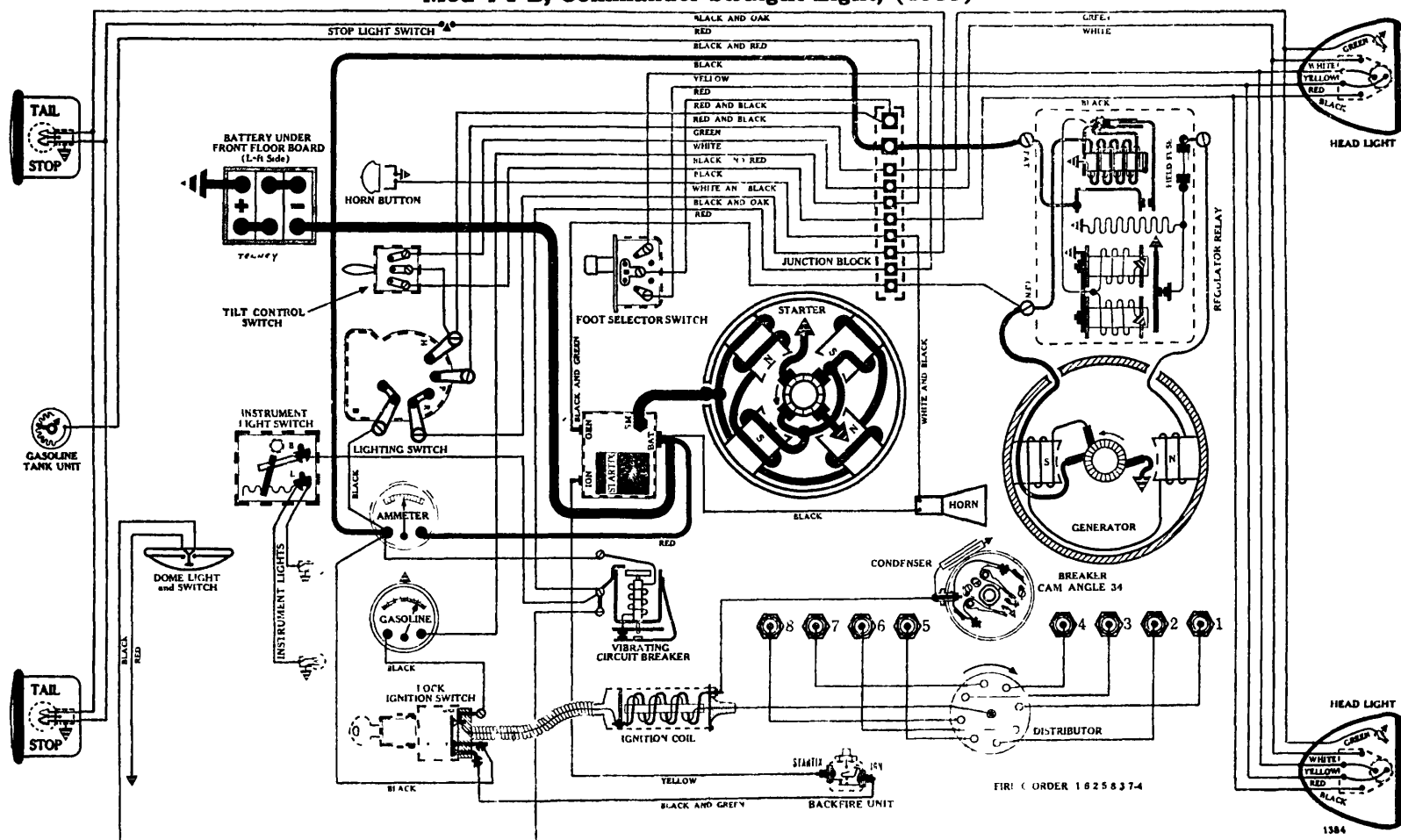
Cut-Out Relay—Closes—.65 to 7.3 volts (hot or cold).
 Opens—0 to 3 amps. discharge.
 Contact Gap—.025 to .035 inch.
 Core Gap—.010 to .030 incl., contacts closed.

Regulator—Contact Spring Tension—10 to 12 oz.
 Points Open—8.3 volts.
 Points Close—7.2 volts.
 Contact Opening—.005 inch (minimum).
 Core Gap—.020 inch (contacts closed).

Switch—Clum, No. 9582.
Location—Behind instrument board.
Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch.
F of Selector Switch—Clum, No. 9584.
Lamps—Refer to "Lamp Data" in Technical Section. **HEAD**—2320; **PARK**—63; **INSTRUMENT**—63; **DOME**—81; **STOP AND TAIL**—1158.

STUDEBAKER

Mod 11-B, Commander Straight Eight, (1935)



BATTERY

Willard, WH-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1.
Lighting Capacity—5.1 amps. for 20 hours (102 amp. hour).
Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

D-R Test No. 407 Rotation, L. H., Com. End
Delco-Remy, 736-H

Connection to Engine—Bendix Drive, Type RCD10FXD-9.
Running Free—65 amps. at 5 volts, 6000 R.P.M.
Cranking Engine—160 to 175 amps. at 5.1 volts.
Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
Brush Spring Tension—32 to 36 oz. on each (new brushes).
Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.
Armature—Delco-Remy, 1838663.

IGNITION

D-R Test No. 955 Rotation, R. H., Top View
Delco-Remy, 662-M
(Full Automatic Spark Advance in conjunction with Delco-Remy, 680-J Vacuum Control.)

Breakers—Contact separation .020 inch.
Cam Angles—Points closed 34 degrees, open 56 degrees (each breaker separately).
Points closed 34 degrees, open 11 degrees (both operating).
Contact Spring Tension—17 to 21 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.
Timing—With No. 1 piston on compression stroke, bring flywheel mark "U.D.C. 1-8" directly under pointer on the right side of flywheel housing. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—18-MM (Champion type 8); Gap .025 inch.
Firing Order—1-6-2-5-8-3-7-4.
Vacuum Advance—2½ to 3½ degrees (Distributor). Starts with vacuum of 3 inches of mercury. Requires vacuum of 6 inches for full travel.
Automatic Advance—14½ degrees (Distributor).
Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist.)
330 165 Start
1000 500 3
1900 950 7
2800 1400 11
3600 (Max.) 1800 14½
Ignition Coil—Delco-Remy, 538-A.
Ignition Switch & Cable—Delco-Remy, 430-A.

GENERATOR

D-R Test No. 1254 Rotation, L. H., Com. End
Delco-Remy, 935-Y

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.5	12	1300	7.6
4	860	6.8	16	1680	7.9
8	1040	7.2	22	2800 (Max.)	8.5

Motoring Freely—3½ to 4 amps. at 6 volts.

Max. Stall Current—23 to 26 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Field Fuse—6 amp. (type 3A-6) in regulator unit.

Brush Spring Tension—Main brushes 22 to 26 oz. Third 18 to 20 oz. (new brushes).

Armature—Delco-Remy, 1856072.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAY-REGULATOR

D-R Test No. 1242

Delco-Remy, 5546

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.4 to 6.8 volts.
Opens—0 to 3 amps. discharge at 6.3 volts.
Contact Gap—.015 to .025 inch.

Regulator—Core Gap—.012 to .017 inch, contacts closed.
Contact Spring Tension—.7 to .9 oz. (measured at contacts).

Air Gap—.028 to .040 inch (armature pressed down against lower stop).

Contact Opening—.008 to .013 inch (armature pressed down against lower stop).

Armature Travel—.028 to .040 inch (armature released).

Points Open—8.35 to 8.65 volts (70° F.).
Points Close—7.3 to 7.7 volts (70° F.).

LIGHTING

Switch—Clum, No. 9583.

Location—Behind instrument board.

Instrument Light Dimming Switch—Clum, No. 13652.

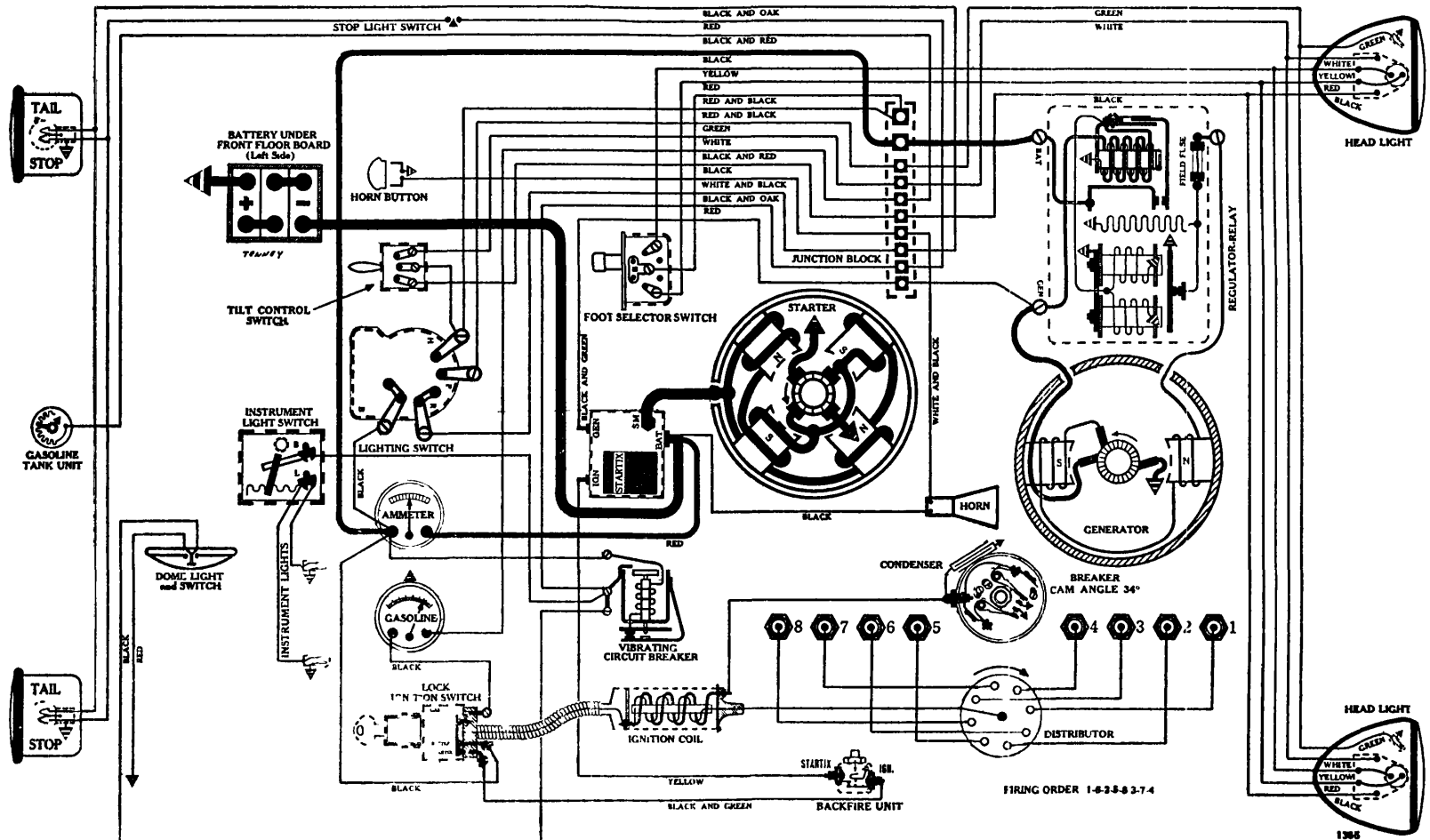
Vibrating Circuit Breaker—Delco-Remy, 410-L. Starts 25 to 30 amps. Operates 10 to 15 amps.

Foot Selector Switch—Clum, No. 9584.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—1000; PARK—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

STUDEBAKER

Mod 1 President, Straight Eight, (1935)



BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded
 Starting Capacity—160 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—5.4.
 Lighting Capacity—6.8 amps. for 20 hours (136 amp. hour).
 Box—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

D-R Test No. 407 Rotation, L. H., Com. End
 Delco-Remy, 736-H
 Connection to Engine—Bendix Drive, Type RCD10FXD-9.
 Running Free—65 amps. at 5 volts, 6000 R.P.M.
 Cranking Engine—160 to 175 amps. at 5.1 volts.
 Lock Torque—15 pound-feet, 570 amps. at 3.1 volts.
 Brush Spring Tension—32 to 36 oz. on each (new brushes).
 Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.
 Armature—Delco-Remy, 1838663.

IGNITION

D-R Test No. 955 Rotation, R. H., Top View
 Delco-Remy, 662-M
 (Full Automatic Spark Advance in conjunction with Delco-Remy, 680-J Vacuum Control.)
 Breakers—Contact separation .020 inch.
 Cam Angles—Points closed 34 degrees, open 56 degrees (each breaker separately).
 Points closed 34 degrees, open 11 degrees (both operating)
 Contact Spring Tension—17 to 21 oz. on each.
 Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions
 Timing—With No 1 piston on compression stroke, bring flywheel mark "U.D.C. 1-8" directly under pointer on the right side of flywheel housing. With rotor under No 1 Dist. Cap Terminal, stationary set of breaker points should just open
 Spark Plugs—18-MM (Champion type 8); Gap .025 inch.
 Firing Order—1-6-2-5-8-3-7-4.
 Vacuum Advance—2½ to 3½ degrees (Distributor). Starts with vacuum of 3 inches of mercury. Requires vacuum of 6 inches for full travel.
 Automatic Advance—14½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
330	165	Start
1000	500	3
1900	950	7
2800	1400	11
3600 (Max.)	1800	14½

 Ignition Coil—Delco-Remy, 538-H.
 Ignition Switch & Cable—Delco-Remy, 430-P.

GENERATOR

D-R Test No. 1254 Rotation, L. H., Com. End
 Delco-Remy, 935-Y
 Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.5	12	1300	7.6
4	860	6.8	16	1680	7.9
8	1040	7.2	22	2800 (Max.)	8.5

 Motoring Freely—3½ to 4 amps. at 6 volts.
 Max. Stall Current—23 to 26 amps. at 6 volts.
 Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.
 Field Fuse—6 amp. (type 3A-6) in regulator unit.
 Brush Spring Tension—Main brushes 22 to 26 oz. Third, 16 to 20 oz. (new brushes).
 Armature—Delco-Remy, 1856072.
 Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAY-REGULATOR

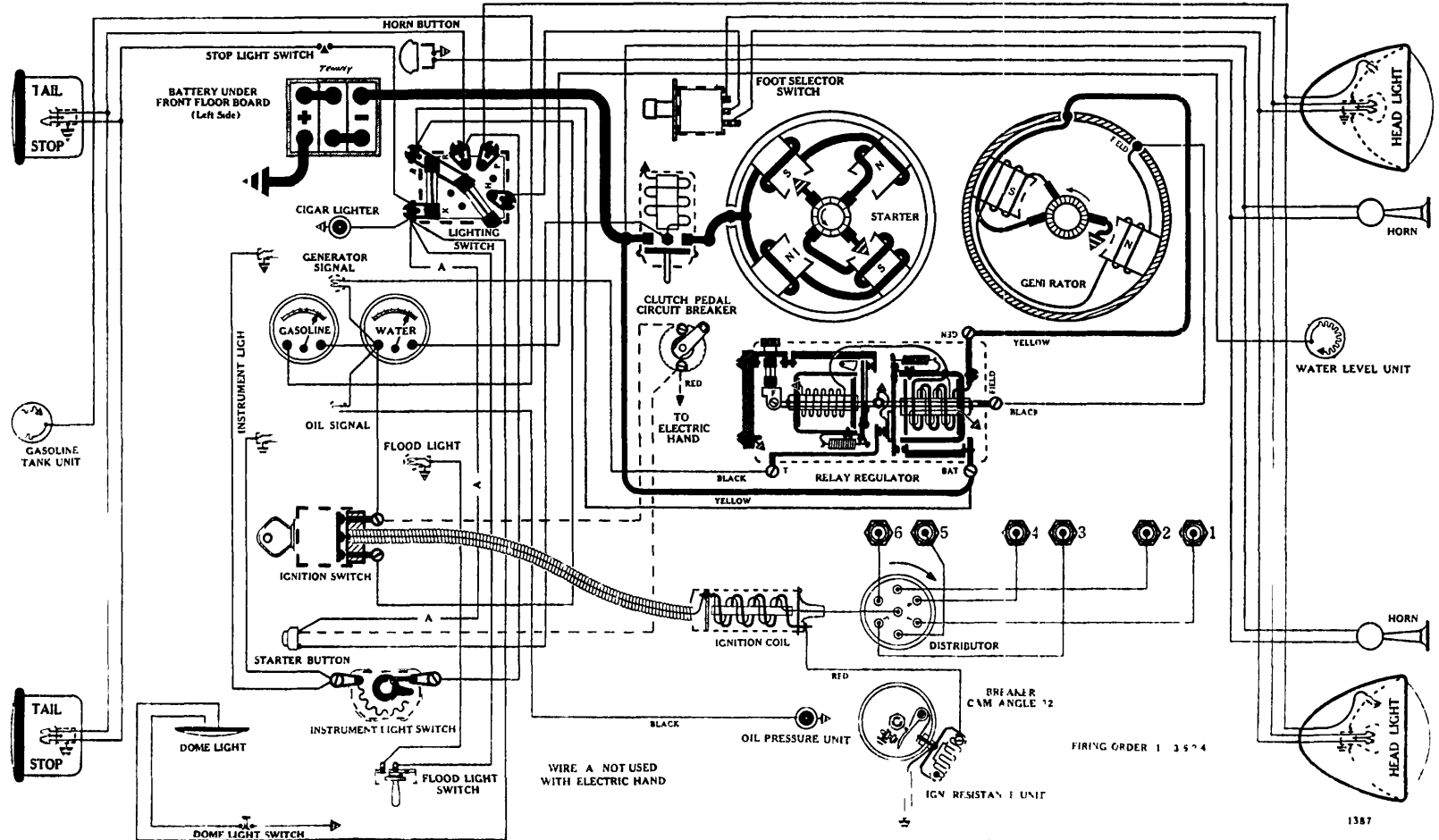
D-R Test No. 1242
 Delco-Remy, 5546
 A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator
 Cut-Out Relay—Closes—6.4 to 6.8 volts.
 Opens—0 to 3 amps. discharge at 6.3 volts.
 Contact Gap—.015 to .025 inch.
 Core Gap—.012 to .017 inch, contacts closed.
 Regulator—Contact Spring Tension—.7 to .9 oz. (measured at contacts).
 Air Gap—.028 to .040 inch (armature pressed down against lower stop).
 Contact Opening—.008 to .013 inch (armature pressed down against lower stop).
 Armature Travel—.028 to .040 inch (armature released).
 Points Open—8.35 to 8.65 volts (70° F.).
 Points Close—7.3 to 7.7 volts (70° F.).

LIGHTING

Switch—Clum, No. 9583.
 Location—Behind instrument board.
 Instrument Light Dimming Switch—Clum, No. 13652.
 Vibrating Circuit Breaker—Delco-Remy, 410-L. Starts 25 to 30 amps. Operates 10 to 15 amps.
 Foot Selector Switch—Clum, No. 9584.
 Lamps—Refer to "Lamp Data" in Technical Section. HEAD—1000; PARK—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

TERRAPLANE

Mod 1 35-GU, DeLuxe, 6 cyl., (1935)



For complete information on the Electric Hand refer to the Technical Section

BATTERY

National, ST3-17X, 6 volts. Positive Terminal Grounded
Starting Capacity—122 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—4.
Lighting Capacity—4.8 amps. for 20 hours (96 amp. hour).
Box—Length, 10-9/16; width, 7 1/4; height, 7-15/16 inches.

STARTER

Rotation, L. H., Com. End
Auto-Lite, MAB-4060

Connection to Engine—Bendix Drive, Type A-1588.
Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.
Cranking Engine—225 to 235 amps. at 5.1 volts.
Lock Torque—15 1/2 pound-feet, 582 amps. at 3 volts.
Brush Spring Tension—44 to 56 oz. on each (new brushes).
Solenoid Starting Switch—Auto-Lite, SS-4001.
Push Button Starting Control Switch—Soreng-Manegold, A-5550-A.
Armature—Auto-Lite, MAB-2114.

IGNITION

Rotation, R. H., Top View
Auto-Lite, IGB-4301-A (Engines 103000-128076)
Auto-Lite, IGB-4301-B (Engines 128077 and up)
(Full Automatic Spark Advance on both)

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 32 degrees; open 28 degrees.
Contact Spring Tension—17 to 19 oz.
Timing—Dist IGB 4301 A—With No 1 piston on compression stroke, slowly turn engine until flywheel mark "U D C 16" is within 1/2 inch (or 4 1/2 flywheel degrees) of the pointer cast in flywheel housing With rotor under No 1 Dist Cap Terminal, breaker points should just open
Dist IGB-4301 B—With No 1 piston on compression stroke, slowly turn engine until flywheel mark "U D C 16" is opposite pointer cast in flywheel housing With rotor under No 1 Dist Cap Terminal, breaker points should just open
Spark Plugs—14-MM (Champion type J-7); Gap .020 to .025 inch
Firing Order—1-5-3-6-2-4.

Automatic Advance—15 degrees (Distributor), Dist. IGB-4301-A.
Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist) Start
800 400 3
1440 720 8
2080 1040 6
3140 1570 11
4000 (Max.) 2000 15

The following is the Spark Advance Curve for the Auto-Lite IGB-4301-B Dist.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist)	Start
600	300	3	3
700	350	6	6
800 (Intermediate)	400	9	9
1660	830	12	12
2530	1265	14 1/2	14 1/2
3250 (Max.)	1625		

Ign. Coil, Lock Switch & Cable Assembly Complete—A-L, IG-4616.
Ign. Coil Only—A-L, IG-3224-S.
Ign. Switch & Cable Assembly Less Lock—A-L, CE-2233-S.
Ignition Lock Number—Briggs & Stratton 45095.
Ignition Key Series—Briggs & Stratton H601-H1100.
Ignition Key Blank Number—Briggs & Stratton 42755.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBK-4602-1 (Belt Drive, Air Cooled)

Performance Data—Gen cold. Field terminal grounded to generator frame.

Amps	R.P.M	Volts	Amps.	R P.M.	Volts
0	775	6.2	10	1175	7.1
2	850	6.3	12	1280	7.3
4	925	6.5	16	1450	7.6
6	975	6.7	18	1850	7.8
8	1085	7.	22	2400 (Max.)	8.3

Motoring Freely—5 amps. at 6 volts.
Max. Stall Current—25 to 28 amps. at 5 1/2 volts.
Field Test—3.9 amps. at 6 volts across field coils in series.
Field Fuse—7 1/2 amp. (type 1A-7 1/2) in regulator unit.
Brush Spring Tension—22 oz. Max. on each (new brushes).
Armature—Auto-Lite, GBK-2055.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4304-A

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

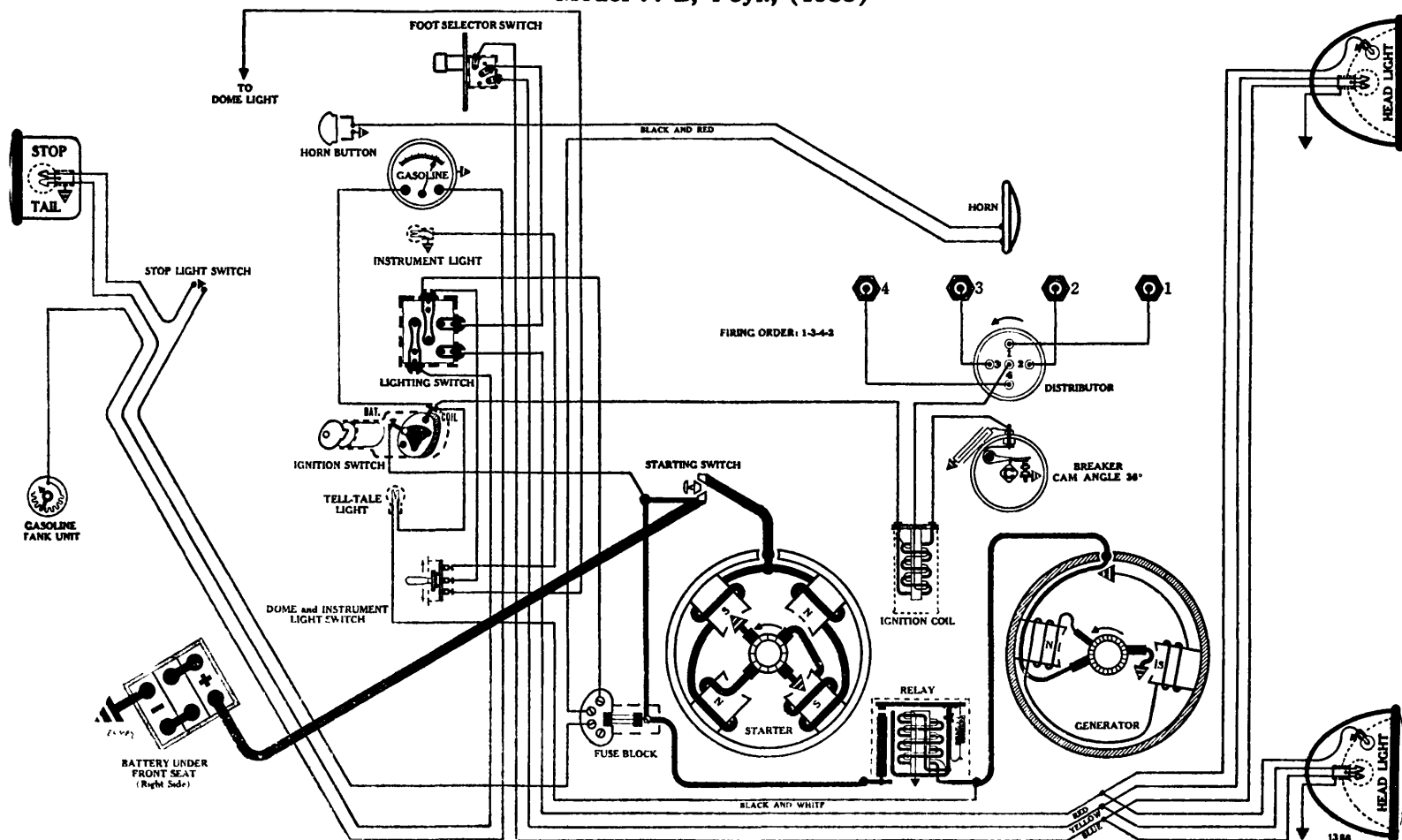
For data see Hudson, 35-GU, Big Six, 1935.

LIGHTING

Switch—Soreng-Manegold, No. 5770-A.
Location—Behind instrument board.
Fuses—Two 20 amp fuses (type 3A-20) mounted on lighting switch.
Foot Selector Switch—Douglas, No. 5331.
Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; INSTRUMENT—63; TELL-TALE—64; FLOOD—63; VESTIBULE—87; DOME—87; STOP AND TAIL—1158.

WILLYS

Model 77-B, 4 cyl., (1935)



BATTERY

U.S.L., A-13-A, 6 volts. Negative Terminal Grounded
 Starting Capacity—96 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—1.9.
 Lighting Capacity—3.9 amps. for 20 hours (78 amp. hour).
 Box—Length, 9; width, 7; height, 8½ inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MZ-4033

Connection to Engine—Bendix Drive, Type RC10HD.
 Running Free—47 amps. at 5½ volts, 4902 R.P.M.
 Cranking Engine—135 to 150 amps. at 5 volts.
 Lock Torque—10 pound-feet, 470 amps. at 3½ volts.
 Brush Spring Tension—44 to 56 oz. on each (new brushes).
 Starting Switch—Auto-Lite, SW-4001.
 Armature—Auto-Lite, MZ-2089.

IGNITION

A-L Test N . 373

Rotation, L. H., Top View
 Auto-Lite, IGB-4078
 (Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
 Cam Angles—Points closed 36 degrees; open 54 degrees.
 Contact Spring Tension—17 to 19 oz.
 Timing—Loosen screw holding flywheel inspection hole cover, located in left top side of flywheel housing, and swing cover to one side. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "Ign" is directly under pointed end of inspection plate screw. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
 Spark Plugs—18-MM (Champion type C-7); Gap .027 inch.
 Firing Order—1-3-4-2.
 Automatic Advance—12½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
600	300		
1040	520	2	
1500	750	4	
1940	970	6	
2400	1200	8	
2850	1425	10	
3400 (Max.)	1700	12½	

Ignition Coil—Auto-Lite, IG-4406.
 Lock Ignition Switch—Mitchell Specialty, Type 17.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAM-4504, (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.4	10	1100	7.2
2	785	6.6	12	1320	7.4
6	960	6.9	16	2400 (Max.)	8.

Motoring Freely—4½ to 5 amps. at 6 volts.
 Max. Stall Current—18 to 20 amps. at 6 volts.
 Field Test—4.2 amps. at 6 volts across field coils in series.
 Brush Spring Tension—22 oz. Max. on each (new brushes).
 Armature—Auto-Lite, GAM-2055.
 Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4008, (Mounted on Sub Frame)

Closes—6¼ to 7½ volts.
 Opens—½ to 2½ amps. discharge.
 Contact Gap—.025 to .035 inch.
 Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Culver-Stearns.
 Location—Lower edge of instrument board, above steering post.
 Fuses—Single 20 amp. fuse (type 3A-20) mounted on block under engine hood (right side).
 Foot Selector Switch—Soreng-Manegold, No. A2100-A.
 Lamps—Refer to "Lamp Data" in Technical Section. HEAD—1110; PARK—63; INSTRUMENT—63; GENERATOR SIGNAL—64; DOME—63; STOP AND TAIL—1158.

1936

SUPPLEMENT

The 1936 Supplement comprises 58 new wiring diagrams, with factory specifications (pages 1389 to 1446 inclusive); 30 new technical pages covering the latest electrical developments; together with Supplementary Car, Distributor, Generator and Starter Indexes.

No.	No.
1389—Auburn, 6-54, 6 cyl.	1416—Graham, 110, "Supercharger", 6 cyl.
1390—Auburn, 6-54, 6 cyl., with Startix	1417—Hudson, 63, 6 cyl.
1391—Auburn, 8-52, Straight Eight	1418—Hudson, 64, 65, 66, 67, Straight Eights
1392—Auburn, 8-52, "Super-Charged" Straight Eight	1419—Hupmobile, G, Series 618, 6 cyl.
1393—Buick, Series 36-40, Special Straight Eight (Early)	1420—Hupmobile, N, Series 621, Straight Eight
1394—Buick, Series 36-40, Special Straight Eight (Late)	1421—Lafayette, 3610, 6 cyl.
1395—Buick, Series 36-60 and 80, Century Straight Eights (Early)	1422—La Salle, 36-50, Straight Eight
1396—Buick, Series 36-60 and 80, Roadmaster Straight Eights (Late)	1423—Lincoln, K Series, "Vee" 12
1397—Buick, Series 36-90, Limited Straight Eight (Early)	1424—Lincoln-Zephyr, 902, "Vee" 12
1398—Buick, Series 36-90, Limited Straight Eight (Late)	1425—Nash, 3620, Ambassador Twin Ign. Six
1399—Cadillac, 36-60, 36-70, and 36-75, "Vee" Eights	1426—Nash, 3640, 3640-A, Series 400, 6 cyl.
1400—Cadillac, 36-80, 36-85, "Vee" 12	1427—Nash, 3680, Ambassador, Twin Ign. Eight
1401—Cadillac, 36-90, "Vee" 16	1428—Oldsmobile, F-36, 6 cyl.
1402—Chevrolet, "Master", Series FA, 6 cyl.	1429—Oldsmobile, L-36, Straight Eight
1403—Chevrolet, "Standard", Series FC, 6 cyl.	1430—Packard, One Twenty-B, Straight Eight
1404—Chrysler, "Airstream", C-7, 6 cyl.	1431—Packard, 1400, 1401, 1402, Straight Eights
1405—Chrysler, C-8, "Airstream", Straight Eight	1432—Packard, 1403, 1404, 1405, Straight Eights
1406—Chrysler, C-9, "Airflow", Straight Eight	1433—Packard, 1407 and 1408, "Vee" Twelves
1407—Chrysler, C-10, C-11, "Imperial Airflow", Straight Eights	1434—Pierce-Arrow, 1601, Straight Eight
1408—Cord, Series 810	1435—Pierce-Arrow, 1602 and 1603, "V e" Twelves
1409—De Soto, S-1, "Airstream", 6 cyl.	1436—Plymouth, P-1, Business 6 cyl.
1410—De Soto, S-2, "Airflow", 6 cyl.	1437—Plymouth, P-2, De Luxe 6 cyl.
1411—Dodge, D-2, 6 cyl.	1438—Pontiac, 36-26, 6 cyl.
1412—Duesenberg, J and SJ	1439—Pontiac, 36-28, 8 cyl.
1413—Ford, 68, "Vee" 8	1440—Reo, 6-D, Flying Cloud, 6 cyl.
1414—Graham, 80, "Crusader", 6 cyl.	1441—Studebaker, 3-A, Dictator 6 cyl.
1415—Graham, 90, "Cavalier", 6 cyl.	1442—Studebaker, 4-A, Dictator 6 cyl.
	1443—Studebaker, 2-C, President Straight Eight
	1444—Terraplane, 61, 6 cyl.
	1445—Terraplane, 62, 6 cyl.
	1446—Willys, 77, 4 cyl.

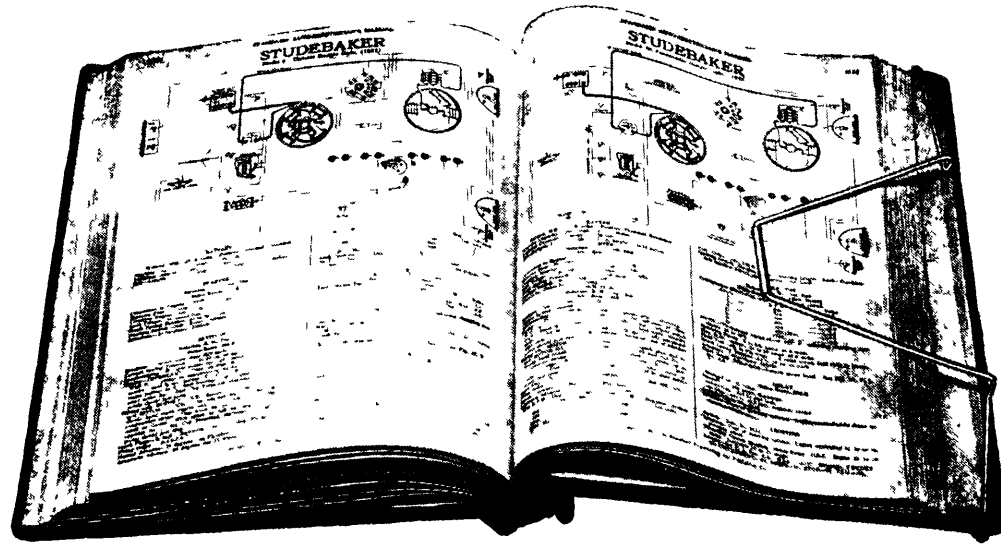
STANDARD ENGINEERING & PUBLISHING CO.

678 Massachusetts Ave., Cambridge, Mass.

PRINTED IN U. S. A.

Specialized Electrical Service Station Tools

"EAGLE GRIP" PAGE HOLDER



This Holder makes it possible for a mechanic to use both hands while doing generator, distributor, or other bench tests, as the Wiring Manual is held flat open to any given page. With the holder your Manual can be used out of doors, while making electrical check-ups on cars, without fear of the wind turning the pages.

Price of Holder **\$0.60**

NEW COVERS AND HOLDER

Complete set of new covers, with choice of either a wide or narrow back flap, and a full set of long or short binding screws (for a ten year or a five year Manual), and a new "Eagle Grip" Holder at a price of only **\$1.75.**

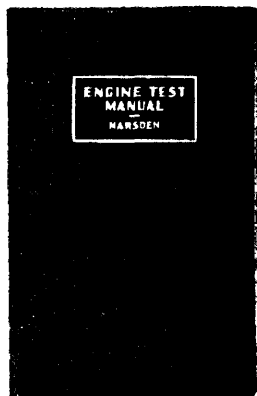
Shipping Weight, 2 lbs.

ENGINE TEST MANUAL

By **MARSDEN**

Member, Society of Automotive Engineers.
Director, Marsden Technical Institute.

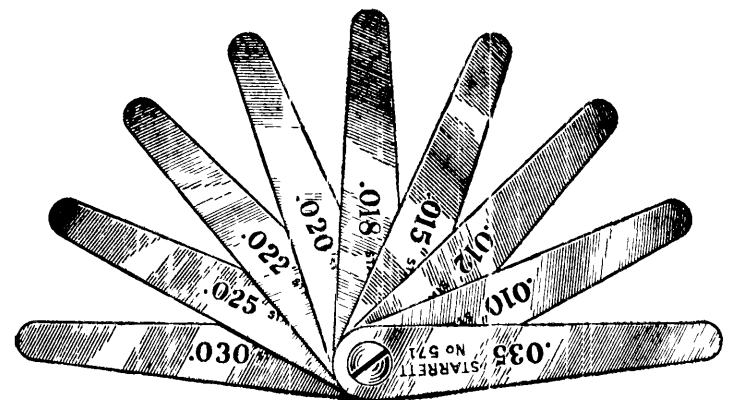
**SOMETHING NEW—JUST OFF THE PRESS—
THE LAST WORD IN MOTOR TUNE-UP!**



A practical shop Manual for the motor mechanic, covering the entire subject of precision tune-up; proper routine, test methods, and use of all types of testing equipment. To our best knowledge and belief this is the only text book now available dealing with the application of instruments to this important work. The Manual includes general information on fuels and gas analyzer equipment. In addition, it explains the detailed tests which should be made on batteries, starters, spark plugs, engine compression, distributors, coils, condensers, cables, fuel pumps, carburetors, generators, and various types of voltage regulators.

Price per copy **\$2.50**

STARRETT NO. 571 AUTO-ELECTRICIAN'S THICKNESS GAUGE



Actual Size

A quality thickness gauge, designed expressly for auto-electricians, testers, and mechanics specializing in engine tune-up and distributor adjusting. The nine tapered leaves give complete coverage for all standard thicknesses now used in adjusting modern ignition distributors, regulators, and spark plugs.

The .012" blade is used in setting the Ford, "Vee" 8 distributors. The .015" blade should be used in adjusting the new and popular eight lobe, single breaker distributors manufactured by Auto-Lite and Delco-Remy. The .018", .020" and .022" leaves are for setting four and six cylinder distributors; while the .025", .030" and .035" leaves give complete coverage for all recommended spark plug gaps. A combination of two or more blades takes care of the air gaps, core gaps, etc., on the new type voltage regulators.

Price a h **\$1.25**

TRUCENTER ARMATURE TURNING KIT (Patented)

IMPORTANT!

The new Trucenter Armature Turning Kit is a complete set of tools which will allow you to turn and finish all sizes of armatures in your shop. The kit includes two improved holders, a lathe dog, a set of bushings, and a set of extractors.

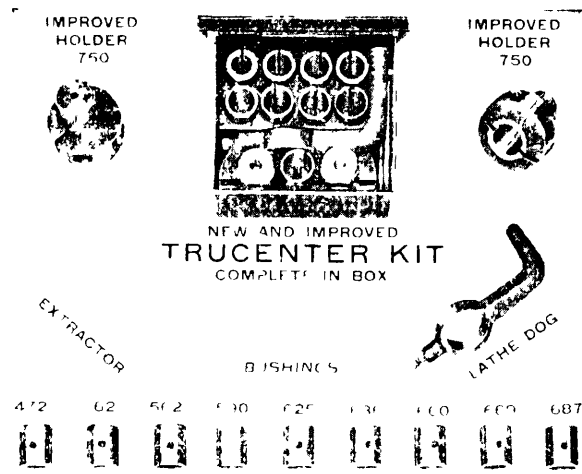


Fig 1

The Trucenter Armature Turning Kit is a complete set of tools which will allow you to turn and finish all sizes of armatures in your shop. The kit includes two improved holders, a lathe dog, a set of bushings, and a set of extractors. The Trucenter Armature Turning Kit is a complete set of tools which will allow you to turn and finish all sizes of armatures in your shop. The kit includes two improved holders, a lathe dog, a set of bushings, and a set of extractors.

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Price Complete, as shown

\$9.75

Shipping Weight 3 lbs

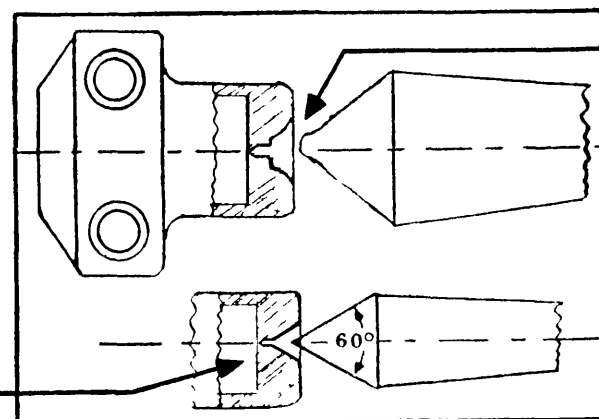
Special Bushings made to order

Price each \$0.80

LATHE CENTER GRINDING SERVICE

If your lathe centers are not in perfect condition, but are blunt, rough, burned, or in an otherwise damaged condition, you not only will find it impossible to do accurate turning on your lathe but if you undertake to run a new Trucenter Kit between them you will ruin the holders the first time they are used.

TRUCENTER HOLDERS WILL GIVE ACCURATE RESULTS AND LAST INDEFINITELY IF USED WITH PROPERLY GROUND AND LUBRICATED CENTERS.



A ROUGH OR BLUNT LATHE CENTER WILL RUIN THE HOLDERS

Full realizing that but few Electrical Service Stations have grinding facilities, we have arranged for prompt service on lathe centers. This means that if we receive your lathe centers in the morning's mail they will be ground and returned to you the same day.

For accurate grinding lathe centers, we take pleasure in offering our service. We have arranged with a local high class grinding establishment to grind your lathe centers in the morning's mail they will be ground and returned to you the same day.

In offering a price of only \$1.00 a set for this unique grinding service, we have completely disregarded the idea of making a profit but are solely interested in helping you to better your service facilities and keep your equipment in a usable condition.

Center Grinding (per pair)

\$1.00

CONTACT SPRING TENSION SCALES

The new, eight lobe, single breaker arm distributors are very sensitive to variations in contact spring tension, and they should be adjusted to the exact tension specified for the particular unit being serviced. Brush spring tensions have been greatly increased, particularly in starting motors and it is equally important that correct brush spring tension be maintained, especially during cold weather when maximum demands are made upon both starting motors and generators

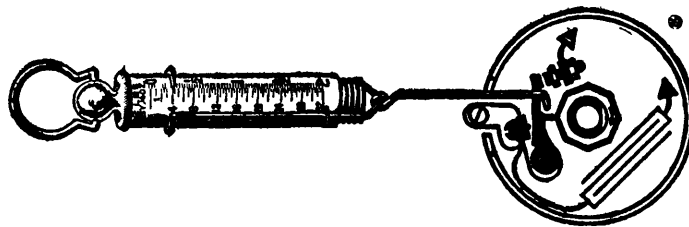


FAN TYPE SCALE

This instrument was developed in the laboratories of one of the large equipment manufacturers, and employs an entirely new principle in making spring tension tests. The dial is graduated in divisions of 4 oz., and has a maximum capacity of 3 lbs. A special attachment is supplied for making brush spring tension tests.

Price each \$2.00

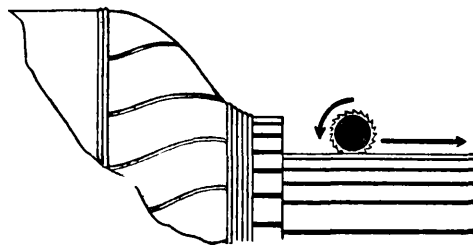
VOLTAGE REGULATOR AND CONTACT SPRING TENSION SCALE



Capacity 2 pounds, graduated in 1/4 ounces. Made of brass and nickelplated. Very sensitive and accurate.

This scale is suitable for measuring the contact spring tension on the new vibrating point voltage and current regulators. It also can be used for testing contact arm spring tension on distributors and brush tension on both starting motors and generators. These scales are built to Standard Engineering specifications by one of the large spring scale manufacturers.

Price each \$2.25

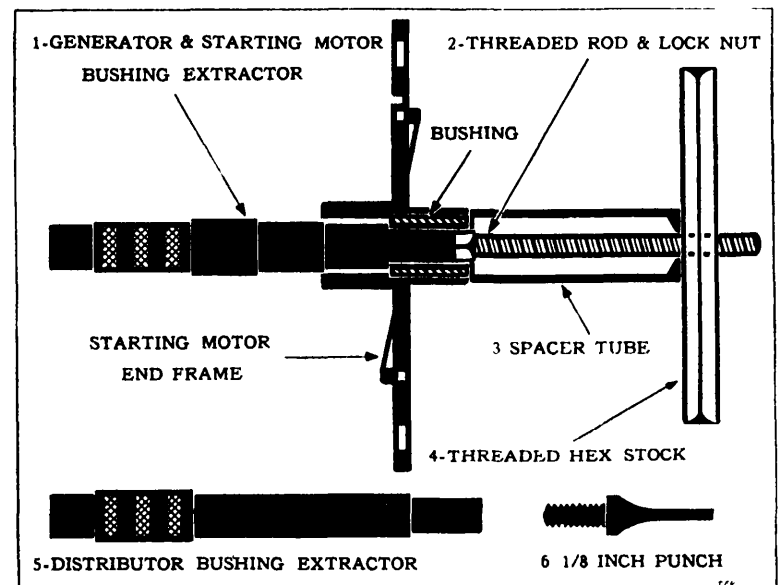
MICA MILLING CUTTERS
(Hullhorst)

Will fit Burton & Rogers, Allen, Weidenhoff, Hullhorst, and many other power undercutters. Diameter of cutters 1/4 inch. Made in five thicknesses. .015", .020", .025", .030", .035".

Price each \$0.25

Package of 9 cutters (3-2-2-1-1) .. \$2.00

BUSHING EXTRACTOR SET

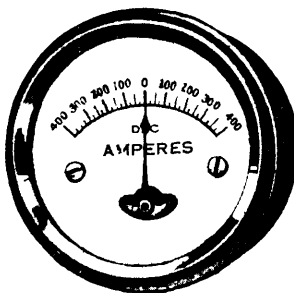


This unique kit fills a long felt want for a simple but effective bushing extractor suitable for use on starting motors, generators, and distributors. It is made up of six parts, and shipped in a substantial metal box. The solid extractor (No. 5 on the illustration) is designed for removing bushings in distributors. The four step extractor (No. 1) has diameters of 1/2, 9/16, 5/8, and 3/4 inches. The small end is drilled and threaded to take the 1/8 inch punch (No. 6). This combination is used for driving out the retaining pins in distributor gears and couplings. When used as a bushing extractor the threaded rod and lock nut is screwed in the small end, the assembly slipped thru the generator or starting motor end frame, and then after slipping on the hollow spacer tube (No. 3), the threaded hex stock (No. 4) is run down on the threads, and used as a wrench in pulling the bushing out. This method of removing bushings is very effective and eliminates any possibility of cracking or damaging end frames.

Price Complete in Metal Box \$5.00

Shipping Weight 2 lbs

STARTER CURRENT INDICATOR



An ideal meter for making quick starting motor tests while unit is still on the car. The scale reads to 400 amps max, and gives an approximate reading of the current drawn by the starting motor. Easy to use, as it is only necessary to place the back of the meter against any part of the starter cable between the battery and starter to get a reading. A special lug on the back of the instrument fits neatly over the cable. No connections to make. No leads to hook up.

Price each \$3.00

Shipping Weight, 1 lb

JACOBS "CENTER REST" CHUCK FOR TURNING CENTERLESS ARMATURES

NOTE: This description is of interest only to Service Station Operators who are using a regular screw cutting engine lathe which, of course, will permit of the mounting of a Universal Chuck on the head stock, and the removal of the center from the tail stock.



Fig. 1



Fig. 2



Fig. 3

Figure 1 shows the new Jacobs "Center Rest" Chuck, which is mounted in the tail stock of a lathe, and permits the turning of round work (centerless armatures with a diameter of from $\frac{1}{4}$ inch to $\frac{3}{4}$ inch), without the use of a center. As a matter of fact, even where the armature is provided with a center hole, this is often damaged, and better results will be secured by chucking the shaft. The stationary bronze jaws provide a bearing for the work which is to be turned, and these jaws are adjusted for the diameter of the armature shaft, and locked in place. Actually the chuck replaces the conventional lathe bed Steady Rest. The chuck is easier and more convenient to use, and has equal accuracy.

Figure 2 shows the solid taper arbor for attaching the chuck to the tail stock. Arbors are made with various tapers to fit all makes and model lathes, however, our engineers have found that Morse No. 2 and No. 3 tapers are the most common ones used. For your convenience in ordering we are printing a template of the Morse tapers (see Fig. 4).

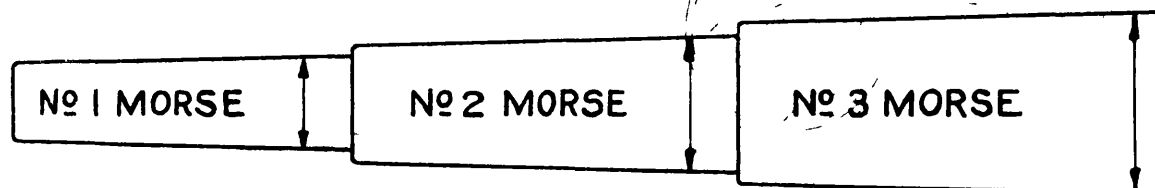
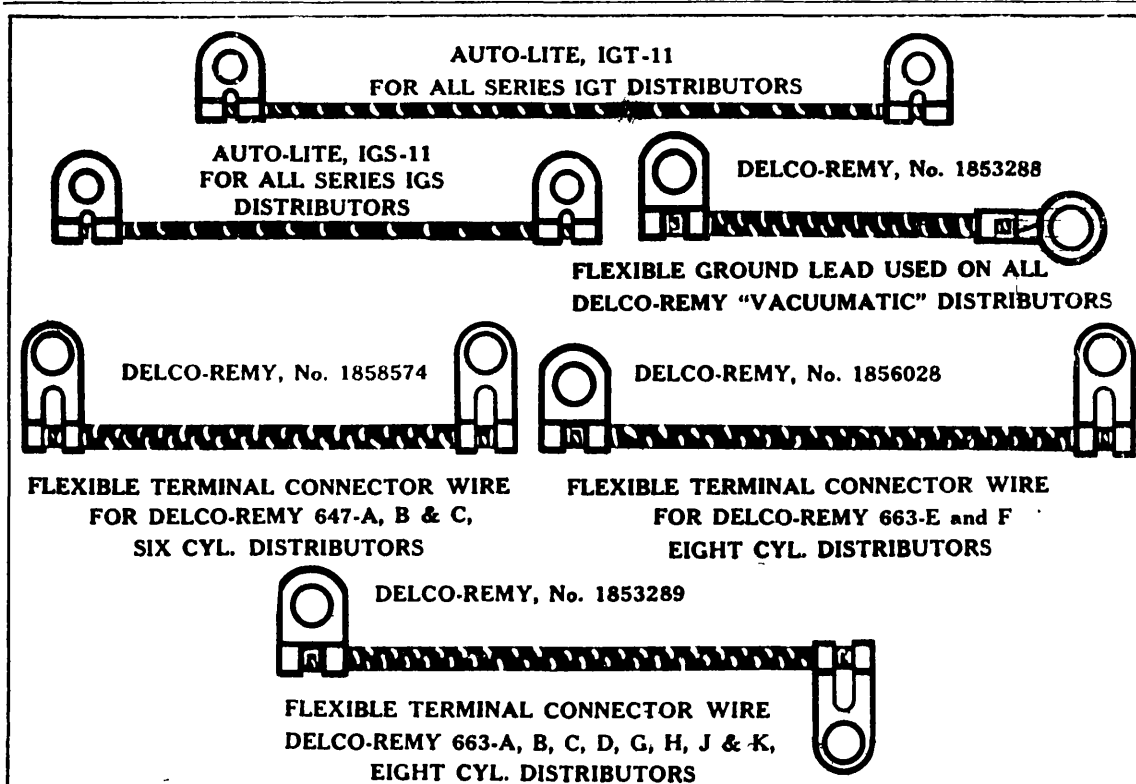


Fig. 4

Take a pair of sharp scissors, and cut along the line. Remove your tail stock center and try the paper template in the hole. From the depth it goes in you can determine the taper number. If your taper hole does not conform to any of the three dimensions shown, supply us with an accurate measurement of the diameter of the hole at the large end, and the approximate length of the center, and our engineers will gladly figure out your requirements, advising you as to the slight extra cost, if any, for a special arbor.

Price of Jacobs "Center Rest" Chuck, capacity $\frac{1}{4}$ inch to $\frac{3}{4}$ inch, with solid arbor, either Morse No. 1, No. 2, or 3 Tapers \$8.75

Shipping Weight, 4 lbs.



AUTO-LITE AND DELCO-REMY "VACUUMATIC" DISTRIBUTOR LEADS

Assorted package of 14 Flexible Leads for all models of Auto-Lite and Delco-Remy "Vacuumatic" Distributors now being used (Sept 1, 1936). Assortment consists of four Delco-Remy 1853288 ground leads, and two each of the others. Be prepared to render prompt and complete service on these new distributors by having all the leads in stock. Refer to illustration to identify the wires.

Price of Assortment \$1.00

Full size drawings of the six Flexible Leads used by Auto-Lite and Delco-Remy. To identify a lead, match your wires with the drawing. Pay particular attention to the Terminals on the Leads, and make sure that they point in the right direction.

1936 TECHNICAL SECTION

INSTRUCTIONS FOR FILING 1936 TECHNICAL DATA IN STANDARD AUTO-ELECTRICIAN'S MANUAL.

Standard Auto-Electrician's Manuals (starting with 1934 Edition "T") have a revised Technical Section, instead of "AA" pages. This section has been divided alphabetically into groups or classifications, starting with "Automatic and Semi-Automatic Starting Devices" and ending with the "Valve and Ignition Timing" group.

At the top of each technical page, on a line with the heading "Standard Auto-Electrician's Manual", you will find two series of numbering. Entirely disregard the numbers on the side towards the wide margin with the punched holes. This series of numbers runs consecutively on Manuals just off the press, and is used in our printing department to identify the forms. The classification headings with numbers, which will be found on the outside of each page, are for your use when filing this material.

If this Supplement is added to an early edition Manual with an "AA" Section (pages 1 to 94), keep this entire new 1936 Technical Section in the same order as you receive it, and insert in Manual as a group, following page 94, Section "AA", or following the 1935 Technical Section, if it was filed as a group.

Because of the demand for accurate test data for use with Motor Analyzers, Oscillographs and other Precision Instruments, manufacturers have recently revised their test specifications, especially those pertaining to voltage regulators, cutouts and distributor spark advance governors. Replacement pages, with revised data, will be found with this Technical Section, and cross out or remove the early pages which have been superceded, that you may work with up-to-date and accurate data when making adjustments.

Because of erroneous cam angle data which has found its way into Service Stations from other sources, our engineers have run extended tests on both Auto-Lite and Delco-Remy distributors. In cases where actual tests show a different setting than official factory specifications we have tabulated both readings, together with our recommendations. Our engineers would be very interested to learn of your results in following the cam angle specifications. Why not keep a record of your distributor numbers and the adjustments which you make? By reviewing and analyzing figures recorded by various operators throughout the country much valuable information will be gained which will later help you, as well as other mechanics. Address your letter to—

Chief Engineer

STANDARD ENGINEERING & PUBLISHING CO.

678 Massachusetts Av., Cambridge, Mass.

LAMP DATA

REVISED TO AUGUST 15, 1936

Code numbers, technical specifications and data verified by The Nela Park Engineering Department
of the General Electric Company, Nela Park, Cleveland, Ohio

CONVENTIONAL MAZDA LAMP

No.	USED FOR	VOLTS	C.P.	BASE	AMPS	STYLE	B or C
35	General Electric Photometric Battery Tester	2.40	15	Miniature Screw	0.80	G-5	B
50	Head Light Indicators (Cadillac and LaSalle 1934)	6-8	1	Miniature Screw	0.20	G-3 1/2	B
51	Indicators, Instrument	6-8	1	Miniature Bayonet	0.20	G-3 1/2	B
55	Indicator, Inst., Aux. Head	6-8	1.5	Miniature Bayonet	0.40	G-4 1/2	C
61	Rear & Inst. (2 in series)	3-4	2	S.C.	0.84	G-6	B
62	Rear & Inst. (2 in series)	3-4	2	D.C.	0.84	G-6	B
63	REAR, INST., MARKER, PARKING	6-8	3	S.C.	0.53	G-6	C
64	REAR, INST., MARKER, PARKING	6-8	3	D.C.	0.53	G-6	C
67	REAR, INST., MARKER, PARKING	12-16	3	S.C.	0.29	G-6	C
68	REAR, INST., MARKER, PARKING	12-16	3	D.C.	0.29	G-6	C
81	DOVE PANEL, INSTRUMENT	6-8	6	S.C.	0.88	G-6	C
82	DOVE PANEL, INSTRUMENT	6-8	6	D.C.	0.88	G-6	C
87	Stop, Backing, Dove	6-8	15	S.C.	1.73	S-8	C
88	Stop, Backing, Dove	6-8	15	D.C.	1.73	S-8	C
89	Dome & Panel, Sign, Marker	12-16	6	S.C.	0.52	G-6	C
90	Dome & Panel, Sign, Marker	12-16	6	D.C.	0.52	G-6	C
1000	Head (2 filaments) depressible beam	6-8	32	D.C.	3.77	RP-11	C
			32		3.77		
1110	Head (2 filaments) depressible beam	6-8	21	D.C.	2.49	RP-11	C
			21		2.49		
1114	Head (2 filaments) depressible beam <i>Read foot-note before installing.</i>	6-8	21	D.C.	2.49	RP-11	C
			21		2.49		
1116	Head (2 filaments) depressible beam	6-8	32	D.C.	3.77	RP-11	C
			21		2.49		
1118	Head (2 filaments) depressible beam <i>Read foot-note before installing.</i>	6-8	32	D.C.	3.77	RP-11	C
			21		2.49		
1129	HEAD, SPOT, STOP, DRIVING LAMPS	6-8	21	S.C.	2.42	S-8	C
1130	HEAD, SPOT, STOP, DRIVING LAMPS	6-8	21	D.C.	2.42	S-8	C
1133	HEAD, SPOT, STOP, DRIVING LAMPS	6-8	32	S.C.	3.66	RP-11	C
1134	HEAD, SPOT, STOP, DRIVING LAMPS	6-8	32	D.C.	3.66	RP-11	C
1141	Head, Spot, Driving Lamps	12-16	21	S.C.	1.21	S-8	C
1142	Motor Coach, Headlamps, Interior	12-16	21	D.C.	1.28	S-8	C
1143	Head, Spot, Driving Lamps	12-16	32	S.C.	1.76	RP-11	C
1144	Head & Spot, Interior	12-16	32	D.C.	1.86	RP-11	C
1158	Head for Fords (1921 to 1928) Also Stop and Tail from 1929 on	6-8	21	D.C.	2.49	S-8	C
			3		0.54		
1170	Head for Fords (1921 to 1928)	6-8	21	D.C.	2.49	S-8	C
			6		0.90		
1172	Head for Fords (1921 to 1928)	6-8	32	D.C.	3.77	RP-11	C
			6		0.90		
2320	(Clear, "V" type Filament). See next page.						
2320-S	(Shielded, "V" type Filament). See next page.						
2330	(Clear, "V" type Filament). See next page.						
2330-S	(Shielded, "V" type Filament). See next page.						
2331	(Clear, "Bar" type Filament). See next page.						
2331-S	(Shielded, "Bar" type Filament). See next page.						
3001	Head for Cadillacs (1932-33 only)	6-8	21	T.C.*	2.92	S-12	C
			21		2.92		
			32		4.09		
3003	Head for Packards (1933-34 only)	6-8	32	T.C.*	4.15	S-12	C
			32		4.15		
			32		4.15		

*Triple Contact

IMPORTANT: Mazda lamps Nos. 1000, 1110, and 1116 are interchangeable. Automobiles equipped with depressible beam headlights (sometimes called "Tilt-Ray" or "Bifocal" headlights) are usually delivered with the 21-21 C.P., No. 1110 lamps as original equipment. If higher C.P. lamps are desired, substitute the 32-32 C.P., No. 1000 lamps, or the No. 1116 lamps. *Under no circumstances use lamps Nos. 1114 or 1118 in these cars.*

The difference between Mazda lamps Nos. 1000, 1110, and 1116, and Mazda lamps Nos. 1114 and 1118 is in the plane of the base pins.

LAMP DATA

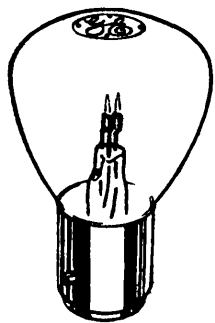
(continued)

REVISED TO AUGUST 15, 1936

The prefocused lamp developed for modern headlights.

(Prefocused lamps will not fit conventional sockets.)

PREFOCUSED MAZDA LAMP		FILAMENT FORM	USED FOR	VOLTS	C.P.	BASE	AMPS	STYLE	B or C
No	BULB								
2320	Clear	"V" type	Head (2 filaments) depressible beam	6-8	32	Pre-	4.23	RP-11	C
					21	Focused	2.75		
2320-S	Shielded	"V" type	Head (2 filaments) depressible beam	6-8	32	Pre-	4.23	RP-11	C
					21	Focused	2.75		
2330	Clear	"V" type	Head (2 filaments) depressible beam	6-8	32	Pre-	4.23	RP-11	C
					32	Focused	4.23		
2330-S	Shielded	"V" type	Head (2 filaments) depressible beam	6-8	32	Pre-	4.23	RP-11	C
					32	Focused	4.23		
2331	Clear	"Bar" type	Head (2 filaments) depressible beam	6-8	32	Pre-	4.34	RP-11	C
					32	Focused	4.18		
2331-S	Shielded	"Bar" type	Head (2 filaments) depressible beam	6-8	32	Pre-	4.34	RP-11	C
					32	Focused	4.18		



CONVENTIONAL
LAMP

A MAJOR ADVANCE IN HEADLIGHTING PRACTICE

The prefocused lamp introduced in 1934 is standard equipment on-almost all 1935 and 1936 cars.

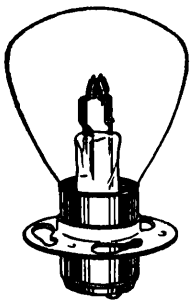
It insures a more uniform performance of headlamps throughout the life of the car

It made possible the new design in headlight equipment whereby headlights were made smaller—to become part of the car's "stream-lines."

It makes for greater beam accuracy.

The lamp itself is made with extreme precision.

The maximum tolerance in the location of the filament is .010 of an inch. The re-flector-socket assembly is also made with greater accuracy.



PREFOCUSED
LAMP



EASY TO INSTALL

Insertion of the lamp is easier than under the old method. The flanged collar has three "buttonholes" unequally spaced, which engage three pins in the socket. The base is marked "TOP."

Hold lamp in position marked "TOP."

Make certain that the pin heads of socket engage wide ends of buttonholes.

Press firmly into the seat at the rear of reflector.

Rotate clockwise until lamp clicks into its seat. To remove lamp reverse the operation.

SHIELDED BULBS MASK DIRECT FILAMENT RAYS

Shielded bulbs differ from conventional types in that there is an opaque coating on the end of the bulb that masks most of the direct rays which normally do not strike the reflector.

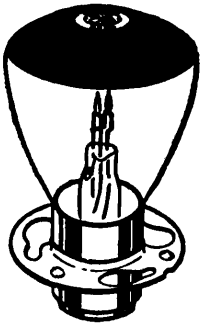
By shielding most of the direct rays, spilled or scattered light is reduced, thereby improving visibility when driving through a hazy or foggy atmosphere.

While the shielded bulb does not reduce glare* from the main driving beam, it minimizes annoyance from scattered light, thereby making headlights more comfortable to the eye when viewed at close range by approaching motorists.

MAZDA shielded bulbs are coated with a black glass enamel which is fused to the bulb. The coating is permanent. It will neither crack nor peel in service.

All popular types of MAZDA headlight lamps may be obtained with shielded bulbs.

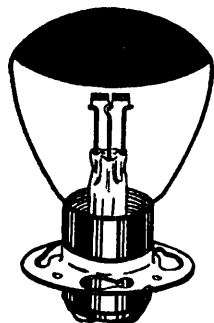
*Serious glare is produced by improperly adjusted headlight beams. The shielded bulb neither eliminates the necessity for proper headlight adjustment nor the need for depressing beams when meeting other cars.



LAMP DATA

(continued)

DOUBLE BAR FILAMENT PREFOCUSED LAMP



The following 1936 cars—Chrysler, Cord, DeSoto, Dodge, Hudson, LaFayette, Nash, Plymouth, Studebaker, Terraplane—have a two-beam headlighting system employing a double-bar filament prefocused lamp. This lamp, known as MAZDA Lamp No. 2331 or 2331-S has, instead of the customary "V" filaments spaced one above the other, two horizontal coiled, or "bar" filaments spaced side by side and with one (the passing filament) slightly above the other.

This lamp can be used only in headlamps expressly designed for it. The prefocusing collar is rotated 90 degrees from its position on the "V" filament lamps; hence the base contacts will line up with the socket contacts only in the proper equipments. This was necessary to avoid use of the wrong lamps with resultant unsatisfactory lighting.

The double-bar filament lamp is available with the new shielded bulb. In fact the shielded bulb lamps are furnished as initial equipment on several cars.

AUTOMATIC CARBURETOR CHOKES

As a general rule automatic carburetor controls are attached to the side of the intake manifold heat jacket. They replace the conventional hand chokes, and function properly under all weather and temperature conditions.

OPERATION

The operation of the automatic carburetor control is governed by variation of three fundamentals in present carburetion systems; namely, hot spot or intake heat jacket temperatures, manifold vacuum, and carburetor air inlet velocities.

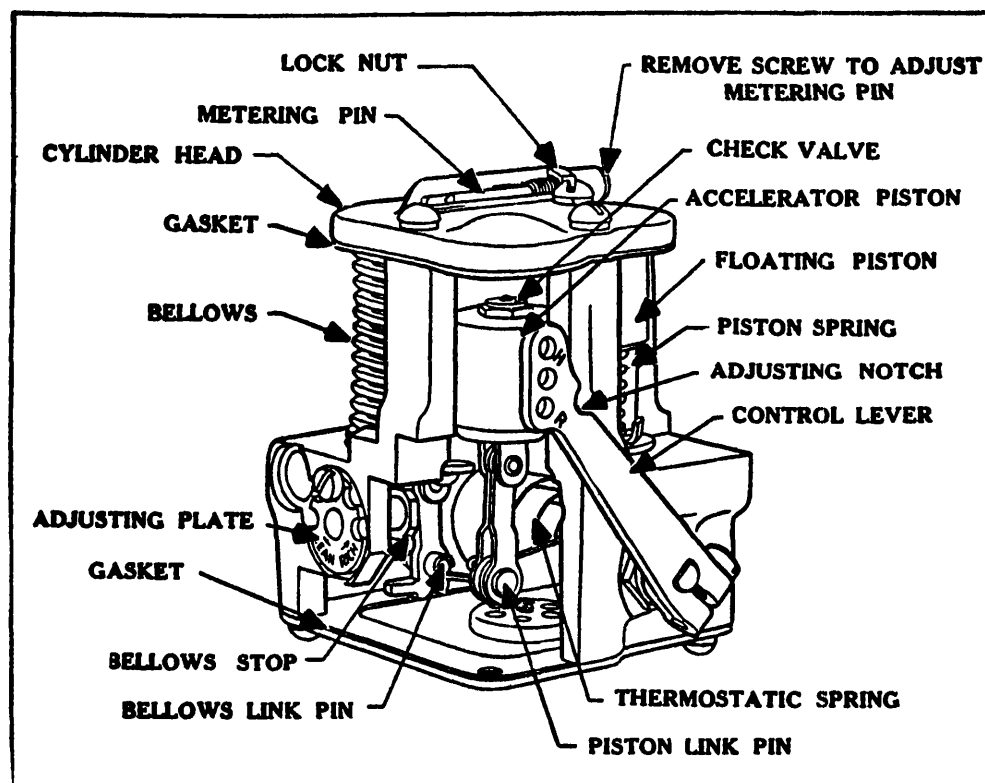


Fig. 1

Drawing showing parts of a three cylinder Delco-Remy Automatic Carburetor Choke.

Delco-Remy manufactures three major types of automatic carburetor controls which may be classified according to the number of cylinders; that is, three cylinder, two cylinder or one cylinder types. All of the chokes incorporate the thermostatic spring feature. The thermostatic spring has one end secured to a shaft which, by means of linkage, controls an off-set choker fly in the carburetor air horn. The other end of the thermostatic spring is connected to a bellows. This thermostatic spring has the property of increasing its tension by further winding itself up as the temperature decreases and unwinds as the temperature increases. Due to this characteristic, when the engine cools, the thermostatic spring increases the tension on the choker fly and chokes the carburetor in accordance with variation in temperatures. When starting a cool engine, the choker fly will be held closed or partially closed, depending on the air temperature, with correct tension until enough fuel has been drawn into the cylinder to produce initial firing. As soon as the engine fires, the vacuum in the manifold rapidly rises and vaporizes a certain amount of fuel which immediately necessitates a leaner mixture. The force of this vacuum is used to collapse the bellows, which rotates the thermostatic spring end in the proper direction to decrease the initial tension on the choker fly of the carburetor, thus opening the fly. The spiral thermostatic spring, which is connected between the control lever and the bellows, gradually decreases the choking action during the warming-up period until it is completely eliminated when the engine becomes warm. After the engine has reached its stabilized operating temperature, the control unit or automatic choke is inoperative, having no further function in the engine performance.

The amount of choker fly opening, for initial running, is regulated by the length of the stroke of the bellows. For the three cylinder type, the length of the bellows stroke is controlled by the Adjusting Plate setting (see Figure 1). On some of the two cylinder types (see Figure 2) the length of the stroke is regulated by variation of the two adjustable set screws, which act as variable stops and are set to give the correct stroke for proper choker fly position. On the one and on some of the two cylinder types of control units the bellows stroke is fixed, and is controlled by the two wings on the bellows link (see Figures 3 and 4). The time or rate of the initial opening is controlled by a metering pin which regulates or meters the vacuum action on the bellows. Further opening of the choker fly is controlled by the thermostatic spring. The tension of the thermostatic spring follows the rise in temperature of the manifold, thereby gradually rotating the control lever until the choke fly reaches its wide open position when the engine has attained normal running temperature.

THREE CYLINDER TYPE (See Figure 1). This type of control unit will properly control the carburetor mixture ratio for quick starting at any temperature and accurately controls the fuel mixture for all conditions of engine operation during the warming-up period. The four stages of the initial starting and warming-up period, during which the principal carburetor corrections are necessary, are cranking, initial running, part throttle, and acceleration.

Cranking. When the engine is cold and the cranking operation takes place, the choker fly in the carburetor air horn is in the closed position. During the cranking period, excessive quantities of gasoline are required because of low temperatures, and because of the minimum vacuum and minimum air velocities during this period, only a small percentage of the fuel is vaporized and initial firing is largely dependent upon surface vaporation.

Initial Running. When the motor first fires, the engine speed and the manifold vacuum suddenly increase. To prevent an excessively rich mixture from being drawn into the manifold, a quick change of the choker fly position takes place with the initial firing. This momentary opening or "hop-off" of the choker fly, which again returns to near the starting position, allows an inrush of air, to carry over the heavier ends of the fuel, which prevents flooding and facilitates running. The vacuum in the engine manifold which tends to collapse the bellows moves the accelerating piston and control lever slowly upward. This movement, known as the "take-off", opens the choker fly in the air horn. It requires 12 to 15 seconds to obtain the full $\frac{3}{8}$ inch travel of the bellows and linkage allowed by the center notch setting on the adjusting disc. The metering pin restricts the air passage which makes it possible to time this action or travel.

Part Throttle. After the initial running period and before stabilized temperatures are reached, only a slight additional enrichment to the regular carburetor setting is required for part throttle running. The required amount of enrichment is dependent upon air temperatures and load conditions and is properly controlled by the thermostat spring.

Acceleration. Quick opening of the throttle causes the vacuum in the manifold to suddenly diminish. Because a carburetor cannot entirely correct for any sudden change in manifold vacuum or air velocities due to over-acceleration during the warming-up period, an independent, automatic mechanical correction is necessary to get solid acceleration while the engine is cold. With the drop in vacuum, the spring under the floating piston forces it to the top and transfers the air to the top of the accelerating piston, thus forcing it downward to give a partial choke for a short interval. The amount of correction necessary gradually decreases as the engine approaches normal operation temperature and the accelerating action of the Automatic Control is correspondingly decreased. After the engine becomes warm, the action of the accelerating piston is negligible.

Disassembling Control Unit. To disassemble the control unit, first remove the inspection plate at the bottom and take out the link pin in the end of the thermostat spring, taking care not to distort or destroy the tension of the thermostat spring. (The thermostatic springs are properly calibrated at the factory and under no circumstances should an attempt be made to re-calibrate them. If the spring becomes distorted in disassembling, replace with a new spring and shaft assembly). Next remove the cylinder head screws which will allow the head and bellows to be removed. The cylinders should be dry and free from dirt or oil. There must not be any holes or breaks in the bellows. (Bellows are made of thin material and should not be stretched or solidly compressed.) Always use a new head gasket when reassembling.

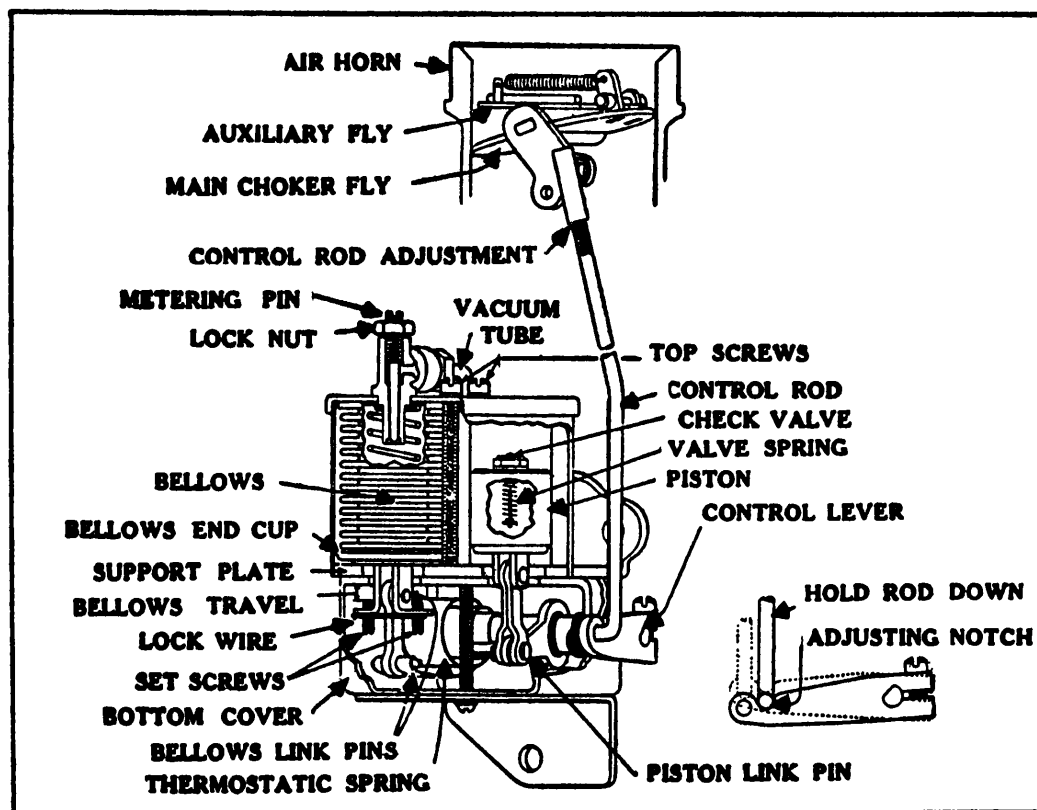


Fig. 2

Drawing showing parts of a two cylinder Delco-Remy Automatic Carburetor Choke.

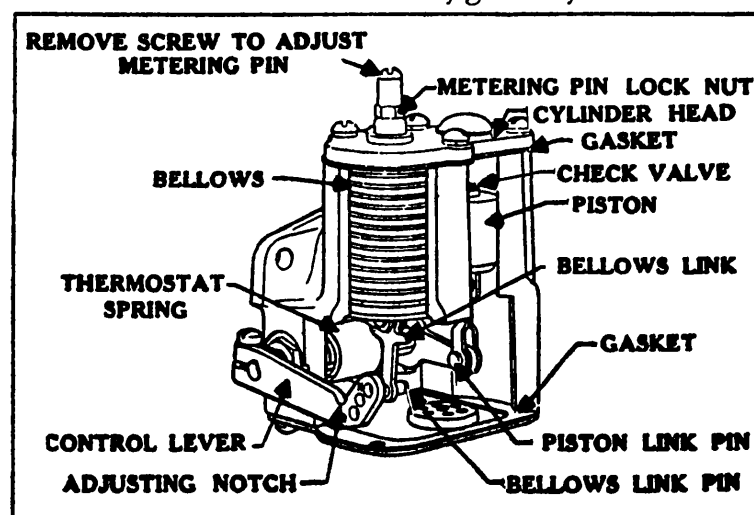


Fig. 3

Drawing showing parts of a two cylinder Delco-Remy Automatic Carburetor Choke.

TWO CYLINDER TYPE. (See Figures 2 and 3.) The operation of this type of unit is similar to the three cylinder type except for the accelerating feature. Solid acceleration during the warming-up period is obtained by means of the piston and cylinder, which function as a dash pot to resist opening of the unbalanced choker fly, due to sudden increases in intake air velocity during the acceleration period. This provides the required increase in richness for solid acceleration during the period of warming-up.

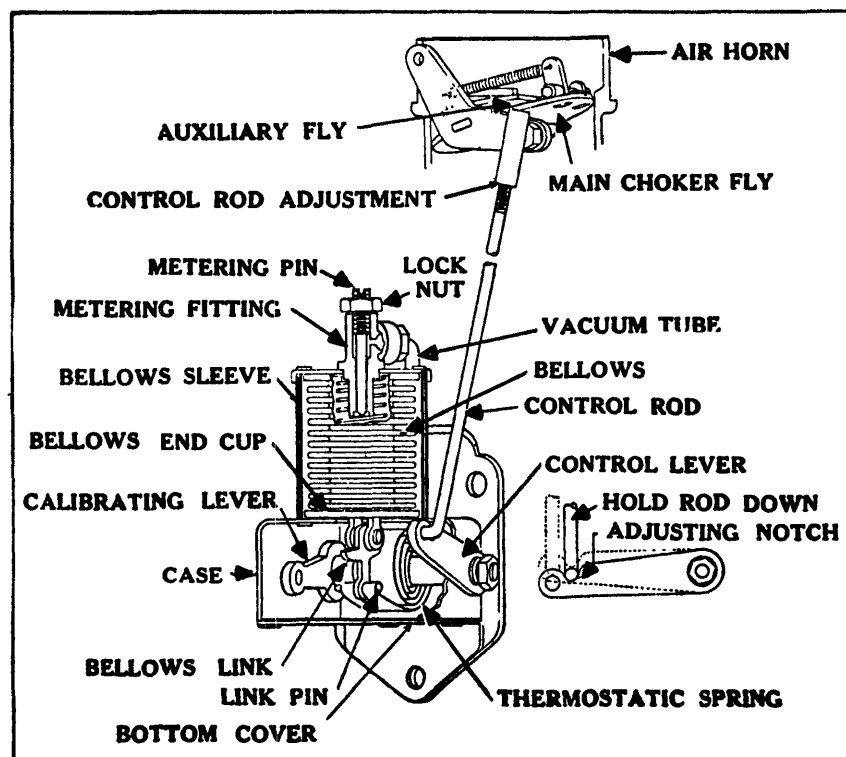


Fig. 4

Drawing showing parts of a one cylinder Delco Remy Automatic Carburetor Control.

ONE CYLINDER TYPE (See Figure 4).

The operation of this type of control unit is similar to the two cylinder type excepting that the accelerating feature is omitted from the choke, being incorporated in the carburetor. This type of control unit properly chokes the engine for all starting and weather conditions. After the engine has reached its stabilized operating temperature, the control unit becomes inoperative until the next cranking operation.

Disassembling Control Unit. To replace the bellows assembly, bend back the small ears at bottom of case sufficiently to remove bottom cover. Remove upper link pin between the bellows end bracket and link by removing the small "hair pin" retainer. Unscrew the tube compression nut from the metering pin fitting. Bend the three ears clamping the cover on top of choke and remove the bellows and cover assembly from the top. Do not disassemble choke unless necessary, to avoid damage to the small ears on the choke case.

To remove the thermostatic spring and shaft assembly, remove the control lever by unscrewing the nut on the end of shaft. Remove the bearing bushing through the case by pulling off the retainer spring on the inside of case. The shaft assembly can then be removed. If for any reason it is necessary to remove the link pin in the end of the thermostatic spring, care must be exercised not to distort the spring as the relation between the end of the spring and the adjacent calibrating lever is important. If necessary to replace the vacuum tube, it can be installed by working it through the hole in the mounting flange. A new tube compression nut is required when replacing the tube. Always use a new gasket between the control unit and manifold if unit has been removed from the manifold.

ADJUSTMENTS

All units are properly calibrated at the factory and should require very little attention in the field; however, incorrect adjustments or abnormal conditions should be checked thoroughly. Before removing the unit from the car, the following should be checked:

1. **Control Rod**—Remove control rod from control lever, holding choker fly and control levers down as far as they will go. (Where the fast idle mechanism is incorporated on the carburetor, the throttle lever must be open so that the idle adjusting screw in

Disassembling Control Unit. Remove the control lever and bottom cover. (Hold unit with the bottom edge of lever resting full length on the edge of a bench or plate so as not to distort the shaft when removing or tightening lever clamp screw.) Take out the link pin in the end of the thermostat spring, being very careful not to distort the spring as the relation between the end of the spring and the adjacent piston lever is important. Remove the piston link pin. Disconnect the vacuum tube from metering fitting. Then remove the top screws, which will allow the cylinder and bellows to be removed by rotating top cover assembly sufficiently to allow the bracket at the bottom end of the bellows to be withdrawn through the hole in the support plate. The cylinder and piston should be dry and free from dirt and oil, also the face of the check valve and valve seat should be dry and clean. There must not be any holes or breaks in the bellows. If the bellows are replaced or the metering pin is removed or changed, it will be necessary to time the vacuum take-off or travel when the unit is again reassembled. If for any reason the vacuum tube is replaced, a new compression nut is required. Always use a new gasket between vacuum tube and manifold, if control unit has been removed from the manifold.

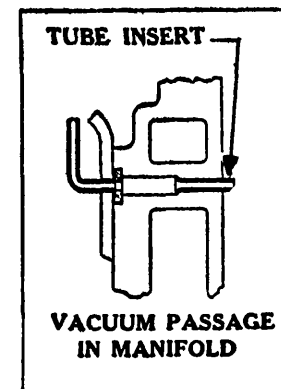


Fig. 5

Drawing showing construction of a two-step Vacuum Passage through the Intake-Manifold.

the throttle lever will clear the fast idle cam to permit the choker fly to be fully closed.) Check length of control rod by adjusting length until rod fits into adjusting notch as shown in Figures 2, 3 and 4. If the control rod is too short, the initial and part throttle running mixture will be too rich and if too long, the mixture will be too lean.

To compensate for the wide range in volatility (ability to vaporize) of the various brands of gasolines, three holes have been incorporated in the control lever on the later model units. (See Figures 1 and 3.) The lower hole marked "R" is to be used for regular or commercial brands of gasolines. If, by having the control rod assembled into the "R" hole, it results in a "loading up" or over-choking of the engine, the rod should be assembled into the center hole. Where highly volatile fuels are used, it may be desirable to locate the rod in the upper hole marked "H." The use of either the center or upper hole results in a leaner choke calibration and will prevent over-choking of the engine during the warming-up period. Fit the control rod into the adjusting notch as described in the previous paragraph before assembling into any one of the three holes in the control lever.

2. **Moving Parts**—With control rod disconnected from control unit lever and held at approximately its working angle, move rod up and down to check for binding or friction in the choker fly shaft bearings or the ball joint connection. Snap the choker fly closed, then open slowly to determine that there is no sticking between the choker fly and carburetor casting. Some models of carburetors have an auxiliary fly as illustrated in Figures 2 and 4 and this auxiliary fly should be checked to see that it floats freely on its pivot. Check for any evidences of bind or friction in the cold idle control mechanism which is operated through a rod connected to the choker fly arm. **MOVING PARTS MUST WORK FREELY. MAKE SURE all moving parts and joints are clean and free from oil. NEVER OIL ANY PART OF THE CONTROL UNIT OR LINKAGE.**

3. **Leak Between Manifold and Control Unit**—Loose mounting bolts or a leaky gasket between the choke and manifold will cause a loss in vacuum resulting in improper operation of the choke. Correct by tightening the mounting bolts or replacing gasket. **Do not use shellac or any sealing compound on the gasket. Use new gasket whenever unit is removed from the manifold.**

4. **Improper Choking**—If the engine fails to start after several trials, with the choker fly in the full choke position, it is possible that the engine is flooded. If the engine is flooded, pull open the choker fly by hand and crank engine to eliminate flooded condition. With engine at air temperature, or choker fly in full or partially choked position, start engine and notice if control lever travels slowly up to its part throttle position. If not, remove control unit from the car, and inspect the vacuum passage in the intake manifold. Experience has shown that when a car has been in service for a long time, this passage will become clogged, with the result that an engine will run with an excessively rich mixture during the warming up period. If the passage is found to be clean and clear, cool the choke to room temperature and check on a test bench. A vacuum may be obtained at the windshield wiper connection of any car, with the engine running at idle, or by using an Allen or Weidenhoff vacuum pump. When replacing automatic chokes of the two cylinder type on some of the first installations (for instance the 1934 Series 40 Buicks) it will be found necessary to drill the vacuum passage and install a TUBE INSERT.

There are four general points to check on an automatic carburetor control to determine if the unit is functioning properly.

1. **Sticking Pistons or Binding in Moving Parts**—After removing the choke from the car, push the control lever up and let it drop back promptly to its original position. If it returns slowly or does not return to the original position, check for bind in bearings, friction due to dirt or rust on dash pot cylinder or pistons, or a sticking check valve. The check valve spring tension can be checked by holding the piston in an inverted position. Tension should be sufficient to hold valve in a closed position, under this condition. If the valve is removed, care should be exercised in tightening it in the piston when reassembling to avoid distorting the valve seat. The choke should be disassembled and pistons and cylinders cleaned thoroughly with gasoline or alcohol. **Do not use sandpaper or emery cloth on pistons or cylinders.**

2. **Bellows Must Be Against Stop When Evacuated**—Remove the bottom cover plate from choke and with vacuum applied, note if the bellows travels up against the stop. If it does not, there is probably a leak in the bellows assembly or an obstruction in the vacuum passage. There must not be any breaks or holes in the bellows. Replace bellows if found to be defective.

Another method of checking for a bellows leak or an obstruction in the vacuum passage is to remove the metering pin, hold finger on the metering pin hole and apply vacuum (If bellows quickly raises the control lever, it indicates that the metering orifice around the metering pin is clogged.) If the control lever does not operate or operates slowly (with metering pin removed) and it is determined by feel that there is vacuum up to this point, it indicates a leak in the bellows assembly. If metering pin is found to be clogged, clean in alcohol and wipe clean. Clean the tapered hole in the metering pin fitting with a No. 000 taper pin reamer, going only deep enough to clean the hole down to the original metal surface. (If a taper reamer cannot be obtained, it is possible to clean the hole by using an extra metering pin on which the threads have been turned or filed down below the root diameter so that a wiping action in the hole can be obtained. Dip the pin in alcohol and wipe the surface of the hole by turning the pin. Repeat dipping and wiping until the hole is clean as evidenced by the appearance of the pin.) After reassembling the metering pin, it is necessary to adjust it for the proper travel and time of the control lever.

3. **Check Travel and Time of Control Lever on Take-Off**—To properly check this operation, it is essential that some method such as using a protractor and pointer to observe the amount of angular travel of the control lever after the vacuum is applied be employed. The protractor (graduated in degrees) should be designed to fit between the control lever and the body of the choke and be held in a fixed position. The pointer should be assembled into the bottom hole in the control lever and set at 0° (zero degrees) on the protractor.

(a) **One Cylinder Types**—Set the pointer at 0° (zero degrees) on protractor and apply vacuum to choke. Note the time and amount of travel of the control lever. (See following Test Data Chart.) The time of the control lever travel can be increased or decreased by adjusting the metering pin in or out, respectively. Always tighten metering pin lock nut securely after adjusting the metering pin.

TEST DATA – AUTOMATIC CARBURETOR CONTROLS

MODEL	TYPE	TAKE-OFF (Control Lever Travel and Time)			Total Travel of Control Lever (Angular Degrees)	Bellows Travel (Inches)	Temperature (Degrees F.) at Which Choker Fly Closes
		Travel — Measured at Lever Hole (Inches)*	Travel — Measured in Angular Degrees*	Time in Seconds			
492-A	1 Cyl.	5/16	10	8-12	17	**	55
498-C	3 Cyl.	7/8	27	10-13	27	3/8	85
498-D	2 Cyl.	5/16	10	10-13	16	1/4	40
498-E	2 Cyl.	5/16	10	10-13	16	1/4	50
498-F	2 Cyl.	5/16	10	10-13	16	1/4	50
498-G	2 Cyl.	5/16	10	8-12	16	1/4	65
498-H	2 Cyl.	5/16	10	10-13	16	**	50
498-J	3 Cyl.	3/4	23	10-13	23	3/8	55

*This dimension is not affected by temperature and is not total travel of control lever except for Models 498-C and 498-J.

**Bellows travel not adjustable on these models.

After the control lever has reached its maximum travel and bellows has had sufficient time to be fully evacuated (about 1.5 minutes), turn off the vacuum and note the time it takes the control lever to travel back to 0° (zero degrees). It should return to 0° (zero degrees) in not less than approximately 30 seconds. If it returns in less than approximately 30 seconds, it indicates a leak or distortion in the bellows.

(b) **Two Cylinder Types**—Check control lever travel and time in the same manner as described for the **One Cylinder Types**. On some of the two cylinder types, the part throttle setting of the choker fly is made by adjusting the set screws to give the proper bellows travel. (See Test Data.) A richer mixture for part throttle is obtained when the bellows travel is decreased; while lengthening the travel gives a leaner mixture.

(c) **Three Cylinder Types**—Check control lever travel and time in the same manner as for the **One and Two Cylinder Types**. The only difference in checking this type is that as soon as the vacuum is applied, there will be a momentary "hop-off" of the control lever before it starts to move up to its maximum travel position. (The "take-off" time is measured from the instant the vacuum is applied until the control lever reaches its maximum travel and includes the momentary "hop-off.") As soon as the vacuum is turned "off" the control lever will suddenly kick back and then travel up to within a few degrees of the full travel position before starting the return travel to zero degrees.

The part throttle setting of the **Three Cylinder Types** is made by moving the **Adjusting Plate** to the **Lean** or **Rich** positions as indicated by the arrows on the **Adjusting Plate**. (See Figure 1.)

4. **Calibration of the Thermostatic Spring**—The thermostatic springs in the chokes are properly calibrated at the factory and, under normal conditions, will not need any further attention in service. However, excessive high running temperatures, caused by sticking heat valves, etc., may cause the thermostatic spring to lose its tension and affect the operation of the choke. The temperature at which the choker fly in the carburetor air horn is fully closed is listed in the Test Data. The position of the choker fly at various temperatures will depend upon the calibration of the thermostatic spring and, for this reason, it is important that the calibration be checked if the choke does not operate properly.

It requires a special test fixture to check the calibration. Do not attempt to adjust these springs without a suitable test fixture.

While the control unit is removed, inspect the vacuum passage in the manifold. On some cars, there is a two-step vacuum passage through the manifold, as shown in Figure 5. The passage through the small tube that is inserted in the manifold is 1/16" diameter. It should be determined that this passage is open and the entire passage free of liquid or foreign material.

Cold Idle Control—Idling speeds must be correct for the proper engine start in summer as in winter.

Electrically Operated Heat Indicators, Gasoline and Water Level Gauges

Two entirely different principles are employed in constructing electrically operated heat indicators, gasoline and water level gauges. Instruments of this type, which have been in general use for a number of years, usually made use of a float, the rise and fall of which transmitted a rotary motion to a variable resistance or rheostat. Changing the resistance of the circuit would, of course, change the amount of current flowing in the circuit, and this variation was caused to register on a properly calibrated gauge, of the volt or ammeter type. The following is a description of the electric gasoline gauge manufactured by the AC Spark Plug Company, and used on Buick, Cadillac, Chevrolet, Oldsmobile, Pontiac and other automobiles.

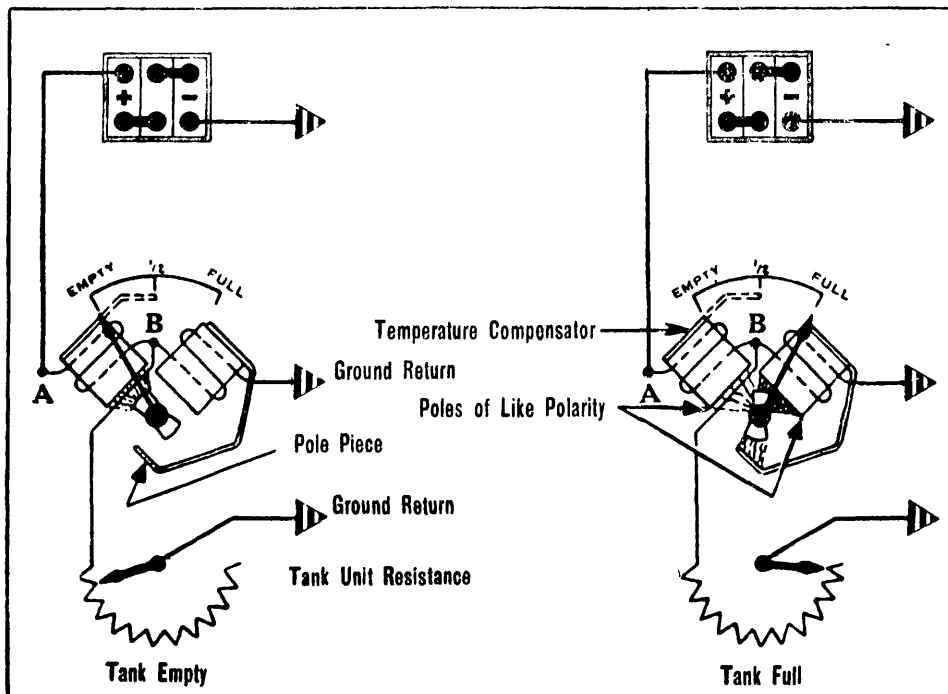


Fig. 1

The fundamental electrical circuits of AC Gasoline Gauges and the magnetic relation of the two Actuating Coils.

enters the dash unit at terminal "A", and must flow thru the "empty" coil to reach terminal "B". When the current reaches terminal "B" it has two paths which it may take on its way to ground and back to the battery. One path is thru the "full" coil (which consists of many turns of fine wire), and the other path is down thru the tank rheostat to ground. As we know, electricity will always take the path of the least resistance, and because of the high resistance of the "full" coil and the fact that the rheostat is "short circuited" out, current will enter terminal "A", flow thru the "empty" coil, and all the current will leave at terminal "B" on its way to ground at the rheostat. No current will flow thru the "full" coil because of its resistance. The "empty" coil will pull the indicator to the empty side of the gauge.

When fuel is added in the gasoline tank the float rises. This, in turn, moves the contact brush in the rheostat, introducing resistance into the circuit that "grounds out" the "full" coil in the dash unit, so that part of the current will begin to flow thru the "full" coil and the pointer will be attracted away from "empty" to a position of balance between the two coils, its point of rest depending upon the amount of resistance introduced into the circuit which, in turn, is governed by the quantity of gasoline that has been added in the tank. The gauge is compensated for temperature variation, and is not affected by a variation in the line voltage, as an increase or decrease in voltage is felt alike by both the "empty" and "full" coils.

Although current consumption of the gauge is approximately but .15 ampere, it is connected in parallel with the ignition circuit, so that there is no discharge of current when the ignition switch is turned "off".

The dash unit (see Fig. 1) consists principally of two coils spaced 90° apart, with an armature and pointer assembly mounted at intersection of the coil axis. An inertia dampener is provided on the armature assembly to prevent vibration of the pointer on rough roads.

The tank unit (see Fig. 2) is essentially a rheostat, the movable contact of which is actuated by a float that rests on the surface of gasoline in the tank. Movement of the float is transferred to the rheostat contact arm by a set of gears. A cork washer, held by a calibrated spring between a collar on the vertical shaft and a stationary lug, acts as a brake. This prevents slight float movements caused by ripples on the surface of the gasoline from appearing on the dash unit indicator.

When the gasoline tank is empty the float assembly is at its lowest position, and the rheostat in the tank unit is grounded or completely "short circuited" out of the gauge circuit. By again referring to Fig. 1 it will be seen that current

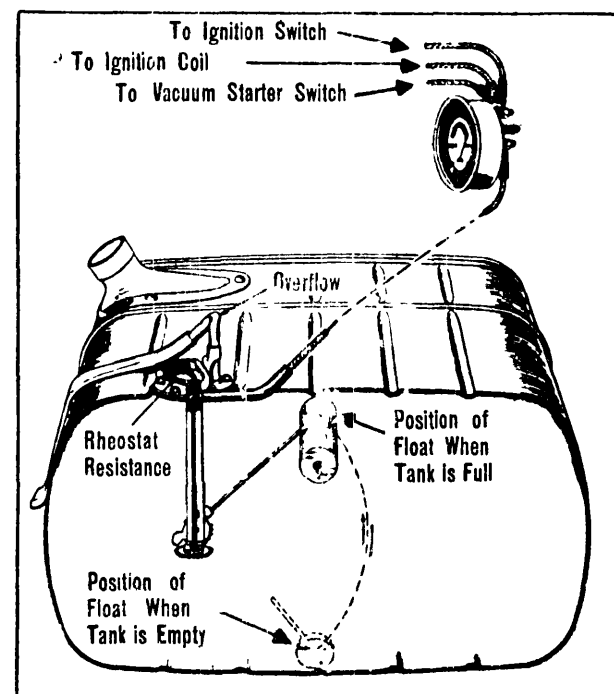


Fig. 2

The AC Gasoline Gauge Tank Unit, showing the Cork Float and Rheostat Resistance

GASOLINE RESERVE

Gasoline gauges are designed to provide approximately 1½ gallons reserve when pointer is at the "empty" position.

CAUTION: Do not lubricate either the dash or tank units. No lubrication is necessary in the dash unit and bearings in the tank unit are automatically lubricated by the splash of gasoline.

When connecting wires to the dash unit, make certain that the white wire having black crossing tracers which leads to the tank unit, does not come in contact with the ammeter connection or the lower terminal on the dash unit marked "ignition", as this may result in damage to the tank unit rheostat.

SERVICE SUGGESTIONS IN CASE OF TROUBLE

If Gauge does not register when Ignition Switch is turned "On"

1. This may be caused by break in circuit between the ignition switch and the dash unit

If Gauge shows "Full" under All Conditions

1. This may be caused by break in circuit between the dash unit and the tank unit. To remedy this, check wire and all connections.

2. Tank unit burned out. Replace tank unit

3. Tank unit improperly "grounded" due to loose mounting screws or paint under screw heads. Tighten screws holding the tank unit. "Ground" the gasoline tank to the chassis and test.

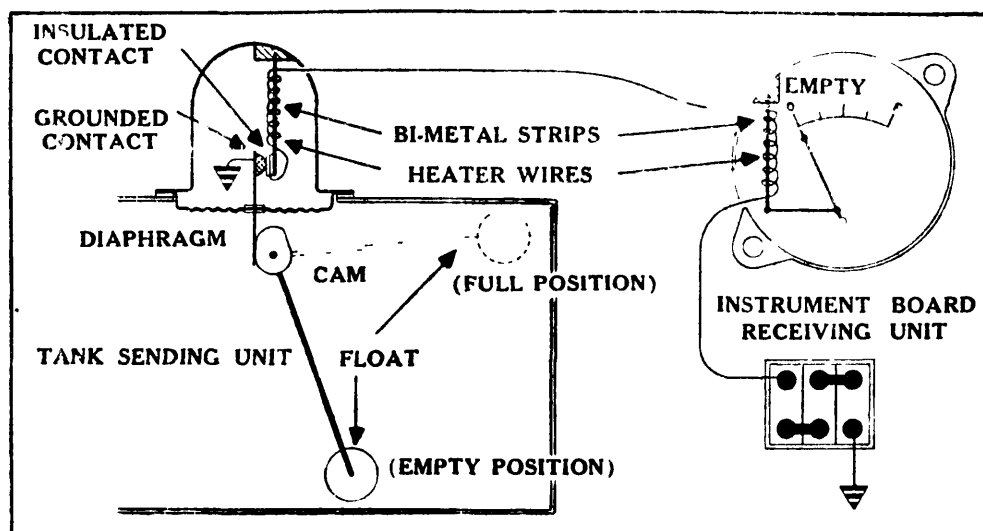


Fig. 3

The King-Seeley Gasoline Gauge System, showing the position of all parts when the Gasoline Tank is empty.

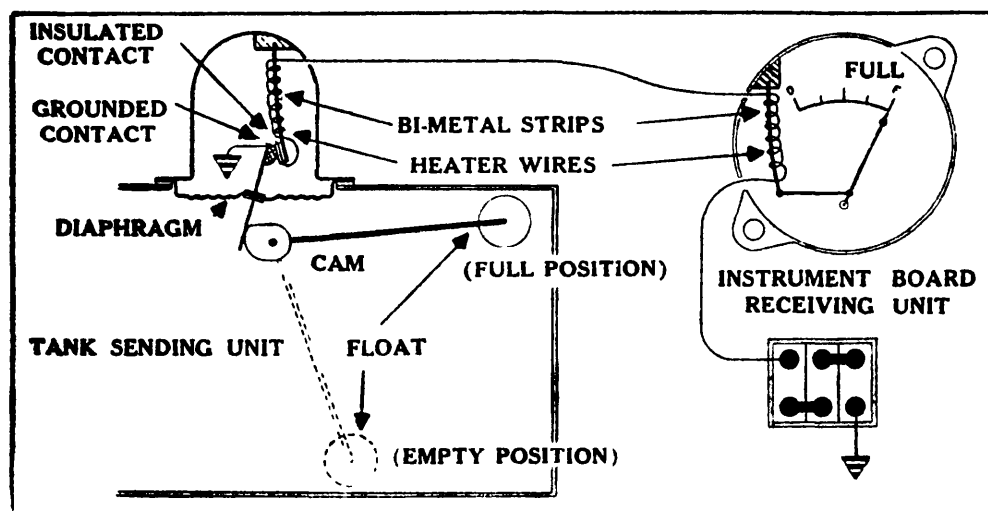


Fig. 4

The King-Seeley Gasoline Gauge System, showing the position of all parts when the Gasoline Tank is full.

If Gauge shows "Empty" under All Conditions

1. This may be caused by wires being reversed on the dash unit. To correct this trouble reattach the wires to proper terminals

2. Dash unit not "grounded" internally. Replace dash unit.

Work in locating the trouble will be considerably simplified if an extra tank unit is available, as this can be temporarily connected up with the gauge by a short piece of wire, and by grounding the body of the test tank unit to the chassis. The float can then be moved manually to either the "full" or "empty" positions. If the dash unit indicates corresponding positions, the trouble is confined to the tank unit and wiring.

GAUGES WHICH EMPLOY A BI-METAL STRIP WHICH BENDS WHEN HEATED

The King-Seeley instruments, used on Ford, Hudson, Terraplane and other automobiles employ an entirely different principle to cause them to operate. This system consists of three parts—the tank unit, which is called the sender; the instrument unit, called the receiver; and the single wire connecting them.

The controlling element of both the sender and the receiver is a bi-metal strip. When a bi-metal strip is heated, it bends, and with this system the movement is utilized to operate the gauge. The bi-metal strips in both the sender and receiver are similar; that is, each will bend the same amount when heated to the same temperature. In order to heat both strips to the same temperature, each has an electrical heating unit wound around it. By referring to Figures 3, 4, 5 and 6, it will be seen that these heating units are connected to a common electrical contact. The circuit is then completed thru the car frame back to the battery. As the current flow in any circuit is everywhere the

same, the same amount of current which passes thru the receiver must also pass thru the sender, so that both bi-metals will be heated a like amount.

The bi-metal in the receiver (Figures 3 and 4) is anchored at the top, and the bottom is connected by a link to a pointer. Heating the bi-metal will cause it to bend to the right, and this movement, amplified by the linkage, will be transmitted to the pointer, moving it to the right. The bi-metal in the sender is also anchored at the top, and carries a contact point at the bottom. When this bi-metal is heated, it moves to the right, away from the grounded point and breaks the circuit.

Figure 3 shows the position of all parts of the gasoline gauge system when the tank is empty. When the current is turned on, it will heat both bi-metals just sufficiently for the contact point of the sender to move away from the grounded contact. The actual movement necessary to break the circuit in the sender is so small that the movement of the pointer is not noticeable. As soon as the circuit is broken the bi-metals begin to cool and straighten, so that contact is again made. This process of making and breaking contact continues from 60 to 100 times a minute, the bi-metal being alternately heated and cooled, but to the eye, the pointer on the dial remains steady.

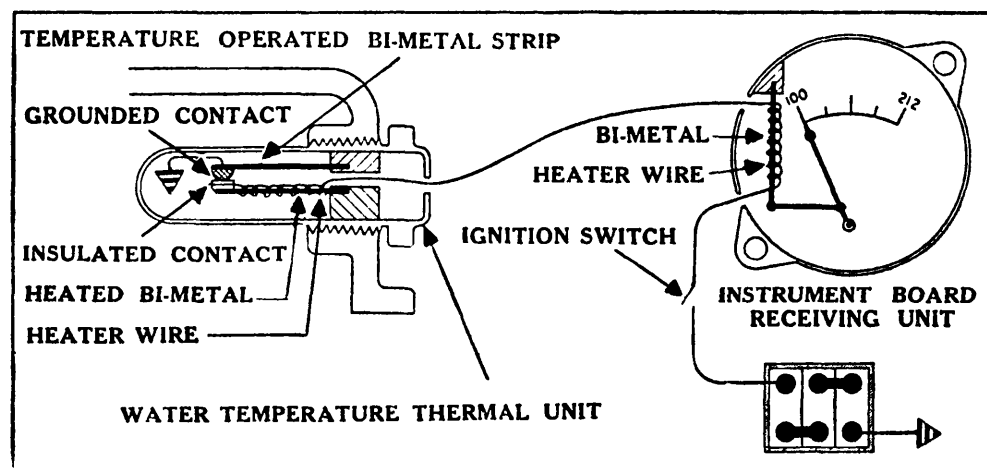


Fig. 5

The King-Seeley Heat Indicator System, showing position of all parts when Engine is cold.

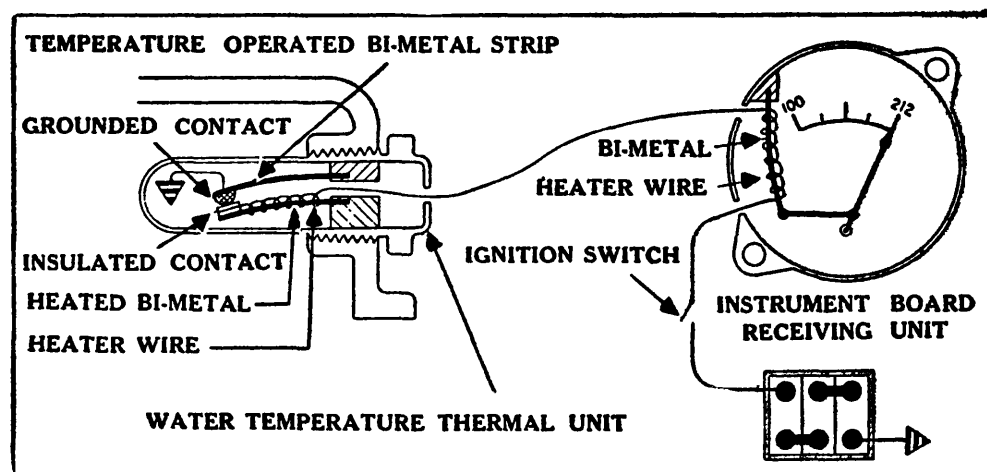


Fig. 6

The King-Seeley Heat Indicator System, showing position of all parts when Engine is hot.

Figure 4 shows the position of the parts when the gasoline tank is full. The float has moved upward and, thru the action of a cam, has pushed the bottom of the rod, on which the point is mounted, to the left, and the grounded point has moved to the right. This movement is made possible by mounting the rod on a flexible diaphragm. With the grounded point moved to the right, it will require more heat to bend the bi-metal in the sender sufficiently to move the contact point away from the grounded point, and break the circuit. The same current, however, that heats the sender bi-metal is also heating the receiver bi-metal and it, likewise, will bend more, moving the pointer farther to the right. As soon as a sufficiently high temperature is reached, the points in the sender alternately open and close, maintaining this temperature and thereby keeping the pointer on the receiver steady and at "full" on the dial.

With the float in any intermediate position, the grounded point will assume a similar intermediate position, as the temperature of the bi-metals at which the contact is broken will determine the position of the pointer on the dial. Since these gauges depend entirely on temperature for their operation a change in line voltage in the system will not affect the gauge readings. A high voltage will, of course, show a change in fuel level more quickly than a low voltage, but the final reading will be the same. The pointer is not affected by jolting of the car, since it is constantly held in position by the bi-metal.

It takes approximately 15 seconds for a gauge pointer to change from "Empty" to "Full", consequently, bobbing of the gasoline tank float is not registered. The actual reading in case of a bobbing float is the average level of the float, which is the actual level of the fuel in the tank when at rest.

The only parts susceptible to deterioration in the entire system are the contact points. Since the average current flowing in the circuit is only one twenty-fifth of an ampere when the tank is empty, and one-fifth of an ampere when the tank is full, the life of the points is practically unlimited.

HEAT INDICATORS

The heat indicator receiver (dash instrument) is identical with the gasoline gauge in construction, and consists of an electrical heating element mounted on a bi-metal strip. As the bi-metal strip is heated it bends, and the indicating hand is moved thru the connecting link.

The sender (cylinder heat unit) differs from the gasoline gauge tank unit only in that the movable point, which is controlled by the movement of the float in the gas tank, is mounted on a bi-metal strip, which determines its position according to the temperature of the strip. The heated bi-metal strip, with the heating unit connected in series with the heating unit in the receiver, is identical with the one used in the gasoline gauge. When the water in the cooling system is cold the temperature operated bi-metal strip is straight, and only slight heating of the heated bi-metal strip is necessary to open the contact. The bi-metal in the receiver does not become heated, and a low reading is obtained on the gauge. This condition is shown by Fig. 5.

As the temperature controlled bi-metal strip is warmed by the water in the cooling system, it bends toward the heated bi-metal strip (see Fig. 6) so that more heat is required from the heating coil to open the contact. This causes the bi-metal strip in the receiver to reach a similar higher temperature and bend, moving the indicating hand to a higher reading.

Care must be exercised in servicing gauges of this type, as a "short" in the line or at the terminals of the sender or receiver, if allowed to exist long enough to raise the hand above its normal range, will permanently damage the receiver unit. When necessary to ground the unit for testing, attach the ground wire with the ignition turned off. Turn the ignition "on", and if the hand registers, turn the ignition "off" when the hand reaches the $\frac{3}{4}$ mark.

lines of force, thereby diverting them away from the regulator armature. This means that the armature is not attracted downwards towards the core, the regulator points do not open, and, as a result, the generator continues to charge at the high rate. When the magnetic shunt becomes warm or hot, its ability to conduct "lines of force" decreases, and the regulator armature then supplies the path, with a resulting early regulator action. To sum this explanation up in a few words would be to say that the regulator magnet is stronger when hot than it is when cold; consequently the points in the generator field circuit are opened sooner in warm weather than in cold weather.

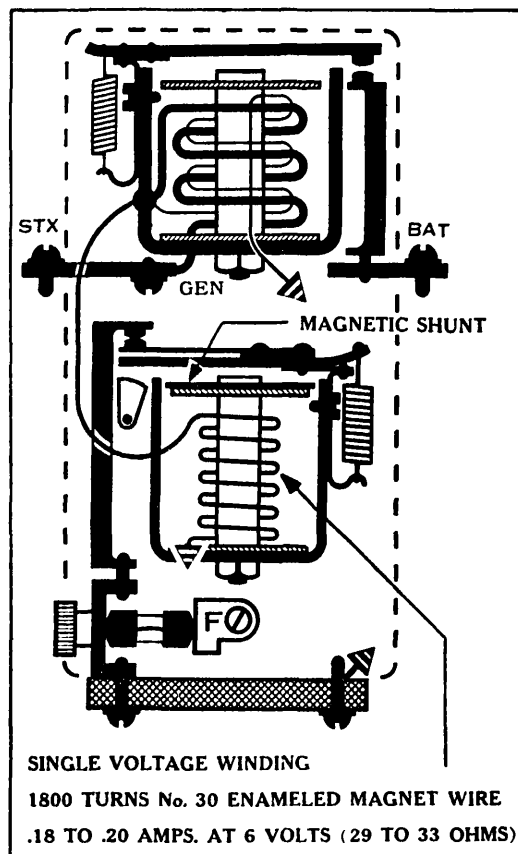


Fig. 3

Internal Circuits of the Auto-Lite Combination Relay Regulator used on the 1935 Packard One Twenty Automobiles.

The necessity for temperature compensation on the regulator is brought about by changing battery characteristics. A battery requires a higher voltage for charging when cold than when warm. Based on a 20-ampere charge rate, the circuits of the voltage regulator are so balanced that the battery characteristics trail the regulator at a given voltage by approximately one-half a volt.

The voltage regulator also compensates the charging rate for increases in load. If the generator is operating on a low rate and a load slightly greater than the low rate is placed on the circuits, the regulator will immediately go to the higher rate due to the drop in voltage occasioned by the increase in electrical load.

There is approximately one volt difference in the generator output occasioned by the voltage regulator; that is, with the field resistance "cut out," the generator potential throughout its entire speed range is raised about one volt above that at which it would charge with the resistance cut in. The generator thereby carries the maximum current demands when these demands exist without forcing the battery to accept this high rate when fully charged, or when no current demands exist.

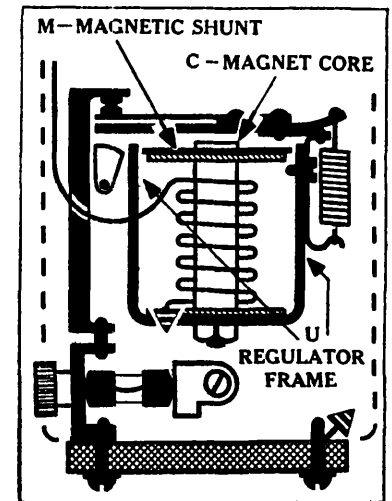


Fig. 4

The Auto-Lite "Magnetic Shunt" used for Temperature Compensation of the Regulator.

ADJUSTING.

To change the voltage at which the points open (high to low charge rate), adjust the armature spring tension by BENDING the lower spring bracket ("A", Fig. 5) to which the spring adjusting nut is soldered. Do not attempt to unsolder the nut. To change the voltage at which the points close (low to high charge rate), turn the brass cam ("B", Fig. 6), which serves as the lower armature stop and, therefore, controls the gap between the contact points when they are open. After adjusting apply a touch of air drying varnish to prevent any possibility of the cam slipping.

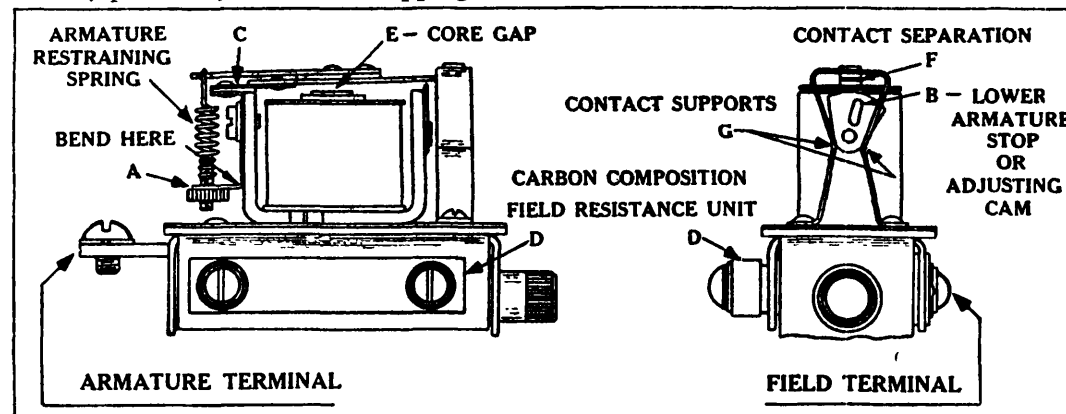


Fig. 5
Adjustments on the Auto-Lite Two-Stage, Voltage Controlled Battery Charge Regulators.

Fig. 6

The core Gap ("E", Fig. 5) should be adjusted to .030 inch. This adjustment is made by expanding or contracting the stationary contact supporting legs ("G", Fig. 6). A core gap greater than specified tends to increase the temperature compensation, and reduces the pressure on the regulator points; while a smaller core gap tends to cause the points to open at lower voltages at extreme temperatures.

The contact separation ("F", Fig. 6), should be adjusted to not less than .005 inch when armature is pressed down against lower stop "B". (Measurements made on regulators in service show average adjustment to be .012 inch.) Contact tension, 1 1/2 to 2 ounces, measured directly over frame of regulator which carries lower armature stop.

Following tests revised to conform with official Auto-Lite Specifications dated Feb. 6, 1936

TC-4100 series charge regulators and TC-4200 series combination circuit breaker and charge regulators should be adjusted to perform in accordance with the following table:

TEST No. 91	
ROOM TEMPERATURE DEGREES F.	POINTS TO OPEN VOLTS
50	8.38 to 8.82
60	8.32 to 8.75
70	8.26 to 8.67
80	8.20 to 8.60
90	8.13 to 8.54
100	8.07 to 8.50
110	8.02 to 8.44

Closing voltage should be below opening voltage by 1.6 to 1.8 volts for any given temperature.

TC-4304 and TC-4304-A only (Hudson and Terraplane 1935) combination circuit breaker and charge regulators should be adjusted to the following specifications and perform in accordance with the table below:—

NICKEL-IRON COMPENSATED.	
Core Gap—.020 inch (contacts closed).	
Contact Separation—.005 inch (minimum).	
Contact Spring Tension—10 to 12 oz.	

TEST No. 114	
ROOM TEMPERATURE DEGREES F.	POINTS TO OPEN VOLTS
50	8.14 to 8.64
60	8.07 to 8.57
70	8.00 to 8.50
80	7.93 to 8.43
90	7.86 to 8.36
100	7.79 to 8.29
110	7.72 to 8.22

Closing voltage should be below opening voltage by 1.2 to 1.4 volts for any given temperature.

TC-4300 series (all others) combination circuit breaker and charge regulators should be adjusted to the following specifications and perform in accordance with table below.

NICKEL-IRON COMPENSATED.	
Core Gap—.020 inch (contacts closed).	
Contact Separation—.005 inch (minimum).	
Contact Spring Tension—10 to 12 oz.	

TEST No. 119	
ROOM TEMPERATURE DEGREES F.	POINTS TO OPEN VOLTS
50	8.4 to 8.9
60	8.32 to 8.82
70	8.25 to 8.75
80	8.18 to 8.68
90	8.10 to 8.60
100	8.03 to 8.53
110	7.96 to 8.46

Closing voltage should be below opening voltage by 1.2 to 1.4 volts for any given temperature.

The following resistance units are available and are marked as shown in the table below.

PART NO.	RESISTANCE	MARKED
TC-51	1.85 to 2.10 ohms	1.85
TC-51A .....	.90 to 1.1 ohms	1
TC-51B	2.75 to 2.95 ohms	2.85
TC-51C	30 to 34 ohms	32
TC-51D	158 to 162 ohms	160
TC-51E	1.0 to 1.2 ohms	1.1
TC-51F	295 to 305 ohms	300

7. Turn on ignition, start engine, and idle at a speed which will show "charge".
8. Cut-out "A. V. R." resistance by turning knob to "out" position.
9. Place toggle switches on both volt and ammeter to read on low scales (10 volt and 30 amp.).
10. With generator showing a charging rate of from 8 to 10 amps. the regulator voltage (if cold, 70 degrees F.), should be 7.7 to 8.0 volts, and if hot (150 degrees F.) the voltage should be 7.45 to 7.55. The "A. V. R." resistance should be used to maintain the 8 to 10 amp. charging rate, while the test is being made. If, however, the charging rate is less than 8 amperes with all the resistance cut-out of the circuit, the car battery will have to be discharged, either by cranking the engine for a short period of time, with the ignition turned "off", or by placing the car in gear, setting the brakes, and closing the starter circuit, which will result in a high rate battery discharge, due to a locked starting motor.
11. After regulator has reached the proper temperature, slow down the engine until the cut-out relay points open.
12. Increase the generator speed to between 2000 and 3000 R.P.M., and proceed with voltage check. If regulator checks within limits specified in paragraph 10 of this section the unit is correctly adjusted. If not, bend lower spring support either up or down until the above readings result.

TABULATION OF ADJUSTMENTS.

DELCO-REMY REGULATORS — MODELS 5557 AND 5588

CUT-OUT RELAY—Closes—6.5 to 7.25 volts.

Opens—0 to 3 amps. discharge at 6.3 volts.

Contact Gap—.018 to .025 inch.

Core Gap—.018 to .022 inch, contacts closed.

REGULATOR—Contact Tension—2.7 to 3.5 oz.

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Gap Between Fiber Bumper and Stop—.008 to .013 inches (armature up).

Contact Separation—.015 to .025 inches (armature all way down).

DELCO-REMY CONTROL UNITS' SPECIFICATIONS. **STEP-VOLTAGE REGULATORS, VIBRATING-POINT CURRENT AND VOLTAGE REGULATORS.**

Data revised Aug. 15, 1936 to conform with Delco-Remy Specifications (1R-185, date of 6-1-36).

		VOLTAGE CONTROL RELAY									CURRENT CONTROL RELAY					CUT-OUT RELAY					
REGULATOR NUMBER	BAT. TERMINAL GROUNDED	CONTACT SPRING TENSION (OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	ARMATURE TRAVEL (INCHES)	OPEN CIRCUIT VOLTAGE	VOLTAGE SETTING 70° F. WITH GENERATOR CHARGING FROM 8 TO 10 AMPS.	POINTS OPEN 70° F. (VOLTS)	POINTS CLOSE 70° F. (VOLTS)	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	SETTING 70° F (AMPS)	AIR GAP (INCHES)	POINT OPENING (INCHES)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS)	TYPE OF UNIT	
5524	P				.012-.015		14.75-15.0										.055-.060	.020-.025	13-14	0-3.0	Vibrating Voltage
5525	P				.012-.015		14.75-15.0							.012-.015	40		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5526	P				.012-.015		14.75-15.0							.012-.015	40		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5528					.012-.015		7.5 - 8.0										.055-.060	.020-.025	6.5 - 7.0	0-3.0	Vibrating Voltage
5529	P				.012-.015		14.75-15.0							.012-.015	18		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5530	P				.012-.015		14.75-15.0							.012-.015	50		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5531	P			.018-.020	.012-.015		14.75-15.0							.012-.015	80		.050	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5533	P				.012-.015		8.3 - 8.5										.055-.060	.020-.025	6.5 - 7.0	0-3.0	Vibrating Voltage
5534	P				.012-.015		8.3 - 8.5										.055-.060	.020-.025	6.5 - 7.0	0-3.0	Vibrating Voltage
5535	P				.012-.015		14.75-15.0										.055-.060	.020-.025	13-14	0-3.0	Vibrating Voltage
5536	P				.012-.015		14.75-15.0										.055-.060	.020-.025	13-14	0-3.0	Vibrating Voltage
5538	P				.012-.015		8.3 - 8.5										.055-.060	.020-.025	6.5 - 7.0	0-3.0	Vibrating Voltage
5539				.050-.060	.015-.020				8.5 - 8.9	7.0-7.5							.012-.017	.015-.025	6.75- 7.5	0-2.5	Two Step Voltage
5540		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5541											2.0-2.5	.006-.008	A .055-.060	.015-.025	B 13-16		.012-.017	.015-.025	6.75- 7.25	0-3.0	Vibrating Current
5542		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5543											2.0-2.5	.006-.008	A .055-.060	.015-.025	C 7.5-8.5		.012-.017	.015-.025	6.75- 7.25	0-3.0	Vibrating Current
5544		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5545											2.0-2.5	.006-.008	A .055-.060	.015-.025	D 6.5-7.5		.012-.017	.015-.025	6.75- 7.25	0-3.0	Vibrating Current
5546		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage

A — Measure air gap with armature pressed down until fiber bumper just touches stop.

B — Generator delivers 19-22 amp. with 11 amp. lamp load.

C — Generator delivers 11-13 amp. with 7 amp. lamp load

D — Generator delivers 10-12 amp. with 7 amp. lamp load.

DELCO-REMY CONTROL UNITS' SPECIFICATIONS.—(Continued)

Data revised Aug. 15, 1936 to conform with Delco-Remy Specifications (1R-185, date of 6-1-36).

		VOLTAGE CONTROL RELAY								CURRENT CONTROL RELAY					CUT-OUT RELAY						
REGULATOR NUMBER	BAT. TERMINAL GROUNDED	CONTACT SPRING TENSION (OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	ARMATURE TRAVEL (INCHES)	OPEN CIRCUIT VOLTAGE	VOLTAGE SETTING 70° F. WITH GENERATOR CHARGING FROM 8 TO 10 AMPS	POINTS OPEN 70° F. (VOLTS)	POINTS CLOSE 70° F (VOLTS)	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	SETTING 70° F (AMPS)	AIR GAP (INCHES)	POINT OPENING (INCHES)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS)	TYPE OF UNIT	
5548		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5549		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5550		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5551		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5552		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5554		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5555		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5556		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5557	N	2.7-3.5	.008-.013	.060-.070	.015-.025		Set on closed cir- cuit only	7.55-7.85									.018-.022	.018-.025	6.5 - 7.0	0-3.0	Vibrating Voltage
5558		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5559	P	2.7-3.5	.008-.013	.060-.070	.015-.025		Set on closed cir- cuit only	7.55-7.85			3.5	.007-.010	.070-.080	.015-.025	20-22		.018-.022	.018-.025	6.5 - 7.0	0-3.0	Vibrating Volt & Cur.
5560		.7- .9		.028-.040	.008-.013	.028-.040			15.5 -16.25	14-15							.012-.017	.015-.025	13.2 -14.0	0-3.5	Two Step Voltage
5561					.012-.015		29.5 -30.0							.012-.015	14		.055-.060	.020-.025	26-27	0-3.0	Vibrating Volt & Cur.
5562					.012-.015		29.5 -30.0							.012-.015	10		.055-.060	.020-.025	26-27	0-3.0	Vibrating Volt & Cur.
5563	P				.012-.015		14.75-15.0										.055-.060	.020-.025	13-14	0-3.0	Vibrating Voltage
5564					.012-.015		14.75-15.0							.012-.015	50		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5565					.012-.015		29.5 -30.0							.012-.015	25		.055-.060	.020-.025	26-27	0-3.0	Vibrating Volt & Cur.
5566	P				.012-.015		14.75-15.0							.012-.015	50		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5567	P				.012-.015		8.3 - 8.5							.012-.015	40		.055-.060	.020-.025	6.5 - 7.0	0-3.0	Vibrating Volt & Cur.
5568	P			.018-.020	.012-.015		14.75-15.0							.012-.015	100		.050	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.

— Measure air gap with armature pressed down until fiber bumper just touches stop.
 Generator delivers 19-22 amp. with 11 amp. lamp load.

C — Generator delivers 11-13 amp. with 7 amp. lamp load.
 D — Generator delivers 10-12 amp. with 7 amp. lamp load.

DELCO-REMY CONTROL UNITS' SPECIFICATIONS.—(Continued)

Data revised Aug. 15, 1936 to conform with Delco-Remy Specifications (1R-185, date of 6-1-36).

		VOLTAGE CONTROL RELAY								CURRENT CONTROL RELAY					CUT-OUT RELAY						
REGULATOR NUMBER	BAT. TERMINAL GROUNDED	CONTACT SPRING TENSION (OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	ARMATURE TRAVEL (INCHES)	OPEN CIRCUIT VOLTAGE	VOLTAGE SETTING 70° F. WITH GENERATOR CHARGING FROM 8 TO 10 AMPS.	POINTS OPEN 70° F. (VOLTS)	POINTS CLOSE 70° F. (VOLTS)	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	SETTING 70° F. (AMPS)	AIR GAP (INCHES)	POINT OPENING (INCHES)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS.)	TYPE OF UNIT	
5569	P				.012-.015		14.75-15.0							.012-.015	30		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5570	P				.012-.015		8.3 - 8.5										.055-.060	.020-.025	6.5 - 7.0	0-3.0	Vibrating Voltage
5571	P						14.75-15.0							.012-.015	57		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5572					.012-.015		29.5 -30.0							.012-.015	14		.055-.060	.020-.025	26-27	0-3.0	Vibrating Volt & Cur.
5573	N				.012-.015		14.75-15.0										.055-.060	.020-.025	13-14	0-3.0	Vibrating Voltage
5574	N				.012-.015		14.75-15.0							.012-.015	40		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur
5575	N				.012-.015		14.75-15.0							.012-.015	33		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5576	P				.012-.015		14.75-15.0							.012-.015	33		.055-.060	.020-.025	13-14	0-3.0	Vibrating Volt & Cur.
5577	P						8.3 - 8.5							.012-.015	50		.055-.060	.020-.025	6.5 - 7.0	0-3.0	Vibrating Volt & Cur.
5581		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5582		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5583		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5584		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5585		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5586		.7- .9		.028-.040	.008-.013	.028-.040			15.5 -16.25	14-15							.012-.017	.015-.025	13.2 -14.0	0-3.5	Two Step Voltage
5587	N	2.7-3.5	.008-.013	A .060-.070	.015-.025			Set on closed cir cuit only	7.3-7.6		3.5	.008-.013	.070-.080	.015-.025	20-22		.018-.022	.015-.025	6.75- 7.5	0-3.0	Vibrating Volt & Cur.
5588	N	2.7-3.5	.008-.013	A .060-.070	.015-.025			Set on closed cir cuit only	7.55-7.85								.018-.022	.015-.025	6.5 - 7.0	0-3.0	Vibrating Voltage
5589		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.015-.025	6.4 - 6.8	0-3.5	Two Step Voltage
5590		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.0	Two Step Voltage
5591	P	2.7-3.5	.008-.013	A .060-.070	.015-.025			Set on closed cir cuit only	7.7-8.0								.018-.022	.018-.025	6.5 - 7.25	0-3.0	Vibrating Voltage

A — Measure air gap with armature pressed down until fiber bumper just touches stop.
B — Generator delivers 19-22 amp. with 11 amp lamp loadC — Generator delivers 11-13 amp. with 7 amp lamp load
D — Generator delivers 10-12 amp with 7 amp lamp load

DELCO-REMY CONTROL UNITS' SPECIFICATIONS.—(Continued)

Data revised Aug. 15, 1936 to conform with Delco-Remy Specifications (1R-185, date of 6-1-36).

		VOLTAGE CONTROL RELAY									CURRENT CONTROL RELAY					CUT-OUT RELAY					
REGULATOR NUMBER	BAT. TERMINAL GROUNDED	CONTACT SPRING TENSION (OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	ARMATURE TRAVEL (INCHES)	OPEN CIRCUIT VOLTAGE	VOLTAGE SETTING 70° F. WITH GENERATOR CHARGING FROM 8 TO 10 AMPS	POINTS OPEN 70° F. (VOLTS)	POINTS CLOSE 70° (VOLTS)	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	SETTING 70° F. (AMPS.)	AIR GAP (INCHES)	POINT OPENING (INCHES)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS.)	TYPE OF UNIT	
5592	N	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir- cuit only	7.7-8.0									.018-.022	.018-.025	6.5 - 7.25	0-3.0	Vibrating Voltage Two Step
5593		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.0	Voltage Two Step
5594		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.5	Voltage Two Step
5595		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Voltage Vibrating
5596	P	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir- cuit only	7.3-7.6			3.5	.008-.013	.070-.080	.015-.025	20-22		.018-.022	.018-.025	6.5 - 7.0	0-3.0	Volt & Cur.
5597	P	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir- cuit only	7.3-7.6			3.5	.008-.013	.070-.080	.015-.025	26-28		.018-.022	.018-.025	6.5 - 7.0	0-3.0	Vibrating Volt & Cur.
5598	P			A .060-.070			Set on closed cir- cuit only	14.3-14.9			3.5	.008-.013	.070-.080	.015-.025	15-17		.018-.022	.018-.025	13-14	0-3.0	Vibrating Volt & Cur.
5599	N	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir- cuit only	7.3-7.6			3.5	.008-.013	.070-.080	.015-.025	26-28		.018-.022	.018-.025	6.5 - 7.0	0-3.0	Vibrating Volt & Cur.
5600	P	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir- cuit only	7.3- 7.6									.018-.022	.018-.025	6.5 - 7.0	0-3.0	Vibrating Voltage Two Step
5800		.7-1.4		.030-.050	.008-.020	.030-.050			7.7 - 8.0	6.7-7.1							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Voltage
5801	N			A .060-.070			Set on closed cir- cuit only	14.3-14.9			3.5	.008-.013	.070-.080	.015-.025	15-17		.018-.022	.018-.025	13-14	0-3.0	Vibrating Volt & Cur
5802	P	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir- cuit only	14.3-14.9									.018-.022	.018-.025	13-14	0-3.0	Vibrating Voltage
5803	P	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir- cuit only	7.3- 7.6									.018-.022	.018-.025	6.5 - 7.0	0-3.0	Vibrating Voltage Two Step
5804		.7- .9		.028-.040	.008-.013	.028-.040			8.15- 8.5	7.2-7.5							.018-.022	.015-.025	6.4 - 6.8	0-3.5	Voltage Two Step
5805		.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0	Voltage
5806	P			A .060-.070			Set on closed cir- cuit only	14.3-14.9			3.5	.008-.013	.070-.080	.015-.025	15-17		.018-.022	.018-.025	12.5 -13.5	0-3.0	Vibrating Volt & Cur.
5809	N			A .060-.070			Set on closed cir- cuit only	7.3- 7.6			3.5	.008-.013	.070-.080	.015-.025	24-26		.018-.022	.018-.025	6.5 - 7.0	0-3.0	Vibrating Volt & Cur.
5810	P			A .060-.070			Set on closed cir- cuit only	7.3- 7.6			3.5	.008-.013	.070-.080	.015-.025	24-26		.018-.022	.018-.025	6.5 - 7.0	0-3.0	Vibrating Volt & Cur.

— Measure air gap with armature pressed down until fiber bumper just touches stop.
 — Generator delivers 19-22 amp. with 11 amp. lamp load.

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Explanation and Proof of Piston Travel Formula

Editor's note:—

Our Engineering Department has received many requests for information on how to convert degrees of flywheel travel into thousandths of an inch of piston travel. For that reason we not only have reproduced a PISTON TRAVEL CHART (as developed and used by the engineers of Joseph Weidenhoff Inc. in making their MOTOR GAUGE tables) but as a matter of interest to Trade School Instructors and Mechanics who understand Trigonometry, we are including the explanation and proof of the piston travel formula used in developing the chart. All calculations are based on the assumption that the length of the connecting rod is exactly *twice* the length of the engine stroke. Refer to your car wiring diagram for engine bore and stroke (found just above the left headlight on all pages printed since 1935).

EXPLANATION OF "PISTON TRAVEL CHART"

The figures across the top and bottom of the chart represent the length of the engine *stroke*. The straight curves represent the *degree of flywheel travel* and are marked with a "degree" sign. The figures at the sides of the chart represent *Piston Travel* in thousandths of an inch.

PROOF OF FORMULA

By referring to Figure 1 it will be seen that the following values are known:—

First—Angle "a", or degrees of crankshaft travel.

Second—Lines YB and YC which represent the length of the connecting rod.

Third—The length of the engine stroke, one-half of which is equal to radius AB or AE.

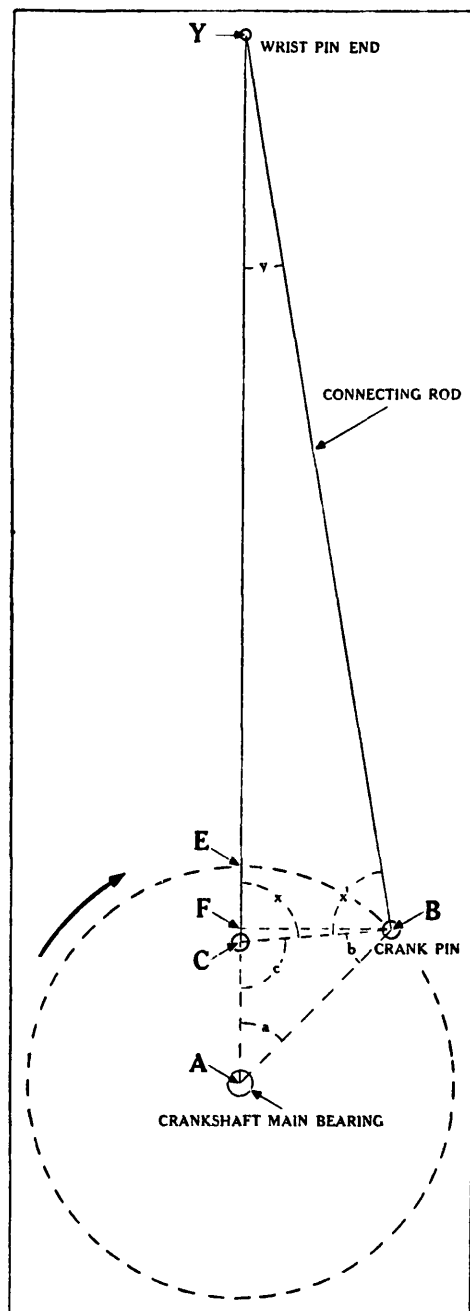


Fig. 1

Angle "y" is the angle of the connecting rod from centerline at piston and must be computed. This can be done as follows:—

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. $\sin a = \frac{FB}{AB}$
or
$\frac{AB}{AB} \cdot \sin a = \frac{FB}{AB}$
$\sin y = \frac{FB}{YB}$
or
$\frac{YB}{YB} \cdot \sin y = \frac{FB}{YB}$ 2. $\therefore YB \cdot \sin y = AB \cdot \sin a$ 3. From which
$\sin y = \frac{AB \cdot \sin a}{YB}$
or
$\sin y = \frac{\sin a}{YB/AB}$ | <ol style="list-style-type: none"> 1. By trigonometric definition. 2. Things that are equal to the same thing are equal to each other. 3. By dividing both sides of the equation by YB. 4. By dividing both the numerator and denominator by AB. |
|--|--|

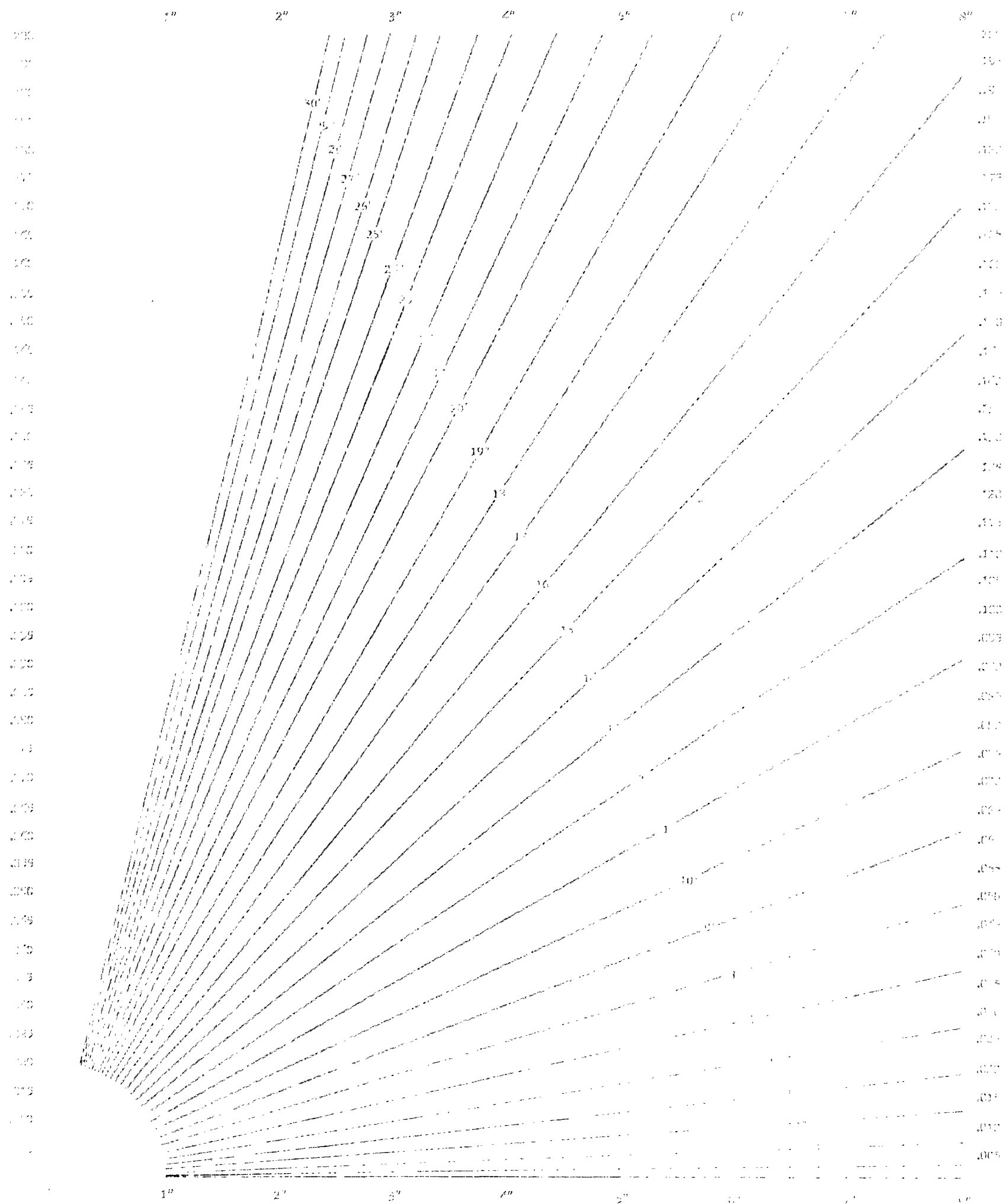
As stated above YB is the length of the connecting rod and AB is the radius of the stroke. Assuming that the length of the rod is twice the stroke (which is very close for all practical purposes) statement 4 can be changed, if desired to:—

- | | |
|---|--|
| <ol style="list-style-type: none"> 5. $\sin y = \frac{\sin a}{4/1}$
or
$\sin y = \frac{\sin a}{4}$ | <ol style="list-style-type: none"> 5. Substitution. |
|---|--|

After the value of $\sin y$ has been found, consult a table of trigonometric functions to find the number of degrees of angle y. After angle y has been computed, the rest of the angles can be found thusly:—

- | | |
|---|---|
| <ol style="list-style-type: none"> 6. $YB = YC$ 7. $\therefore \text{angle } x = \text{angle } x'$ 8. $\therefore 2x + y = 180^\circ$ 9. $2x = 180^\circ - y$ 10. $x = \frac{180^\circ - y}{2}$ | <ol style="list-style-type: none"> 6. Given. 7. In an isosceles triangle the angles opposite the equal sides are equal. 8. The sum of the angles of a triangle equal 180°. 9. By subtracting y from both sides of the equation. 10. By dividing both sides of the equation by 2. |
|---|---|
- After angle "x" has been computed, angle "c" can be found thusly:—
- | | |
|---|---|
| <ol style="list-style-type: none"> 11. $\text{Angle } c = 180^\circ - x$ 12. $\text{Angle } b = 180^\circ - (a + c)$ 13. $\text{Line } AC = \frac{AB \cdot \sin b}{\sin c}$ 14. $AE = AC + CE$
or
$CE \text{ (Piston Travel)} = AE - AC$ | <ol style="list-style-type: none"> 11. Line AY is a straight angle. 12. The sum of the angles of a triangle equal 180°. 13. Law of sines:—The sides of a triangle are proportional to the sines of the opposite angles. 14. A whole is equal to the sum of all its parts. 15. By subtracting AC from both sides of the equation. |
|---|---|

PISTON TRAVEL CHART



REPAIRING AUTO-LITE SERIES "MAW" AND "MAX" STARTING MOTORS

INSTALLING FIELD EQUALIZERS

Auto-Lite starting motors of the MAW and MAX types, built previous to April 15, 1935, were made without a field equalizer which should connect the two insulated main brushes. Fig. 1 shows internal circuit diagrams (commutator end views) of an Auto-Lite Series MAX starting motor, together with an MAW consequent pole starting motor, as they originally were built without an equalizer. These starting motors are found on the entire Chrysler line of automobiles, and the Packard "One Twenty" cars. Fig. 2 shows one of the MAW starting motors with a field equalizer.

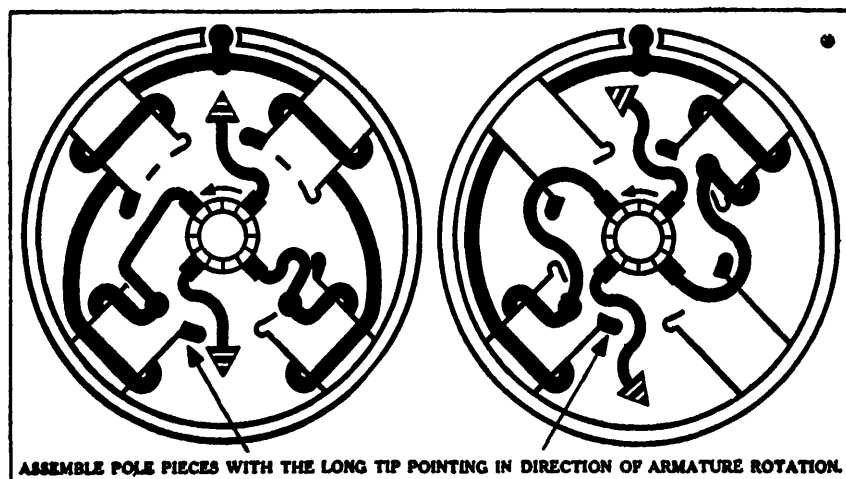


Fig. 1

Internal Circuit Diagrams of the Early Auto-Lite Series MAX Four Wound Pole, and the Series MAW Consequent Pole Starting Motors without Field Equalizers.

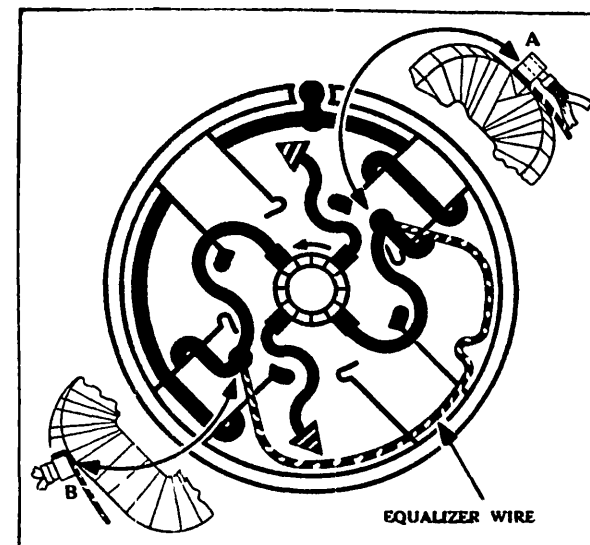


Fig. 2

Internal Circuit Diagram of the Auto-Lite MAW Starting Motor with Equalizer Wire installed.

When overhauling or repairing Auto-Lite MAW and MAX starting motors, a field equalizer should be installed if the unit is found to be without one, regardless of whether or not the commutator shows signs of being burnt or is "smoky". Three different equalizer wires are available for making this change. Fig. 3 shows two views, top and side, of each wire, and as the drawings are full size the wires may be identified by placing them right on the drawing.

STARTING MOTOR TYPE

EQUALIZER WIRE PART NO.

MAW—With switch on starter	MAW-58
MAW—With terminal post	MAW-59
MAX—All models	MAX-58

HOW TO INSTALL THE EQUALIZER WIRE

Dismantle the starting motor, remove end frames and armature. Turn and polish but do not undercut the commutator. By referring to Fig. 3 determine proper equalizer to be used, and place the ends in the grooves formed by the end of the field coil, where it loops around the brush "pigtail". See details "A" and "B", Fig. 2. Solder the ends of the equalizer wire securely in place, using a NON-ACID soldering flux. We recommend the use of either "No-Corode" soldering paste or an alkaline flux made of 2½ oz. water, white rosin, and 1½ pint of No. 1 completely denatured alcohol which has been thoroughly mixed.

Before assembling a starting motor inspect the commutator end housing in order to locate an oil overflow drain hole in the end of the bearing housing. If no oil hole can be found drill a 1/8 inch hole in the housing, as shown by Fig. 4. The hole should be located on the vertical center line of the bearing housing, in the position the starting motor takes when installed on the engine.

Inspect both the commutator end and the drive end bearings for wear, and replace if the clearance between the armature shaft and bearing exceeds four thousandths of an inch. Inspect the four brushes. When in place the long side of the brushes should be towards the direction of armature rotation. Brushes should show a full contact from toe to heel for not less than half of their width.

ASSEMBLING STARTING MOTORS

When a unit is fully assembled inspect to see that the equalizer wire is not grounded on the frame screw, and that the grounded brush pigtails do not come in contact with the equalizer. Carefully check the brush spring tensions. The correct tension is from 44 to 56 oz. when the scale is hooked in the high loop of the spring just over the brush holder, or from 32 to 40 oz. when the scale is hooked under the end of the spring which rests on the brush.

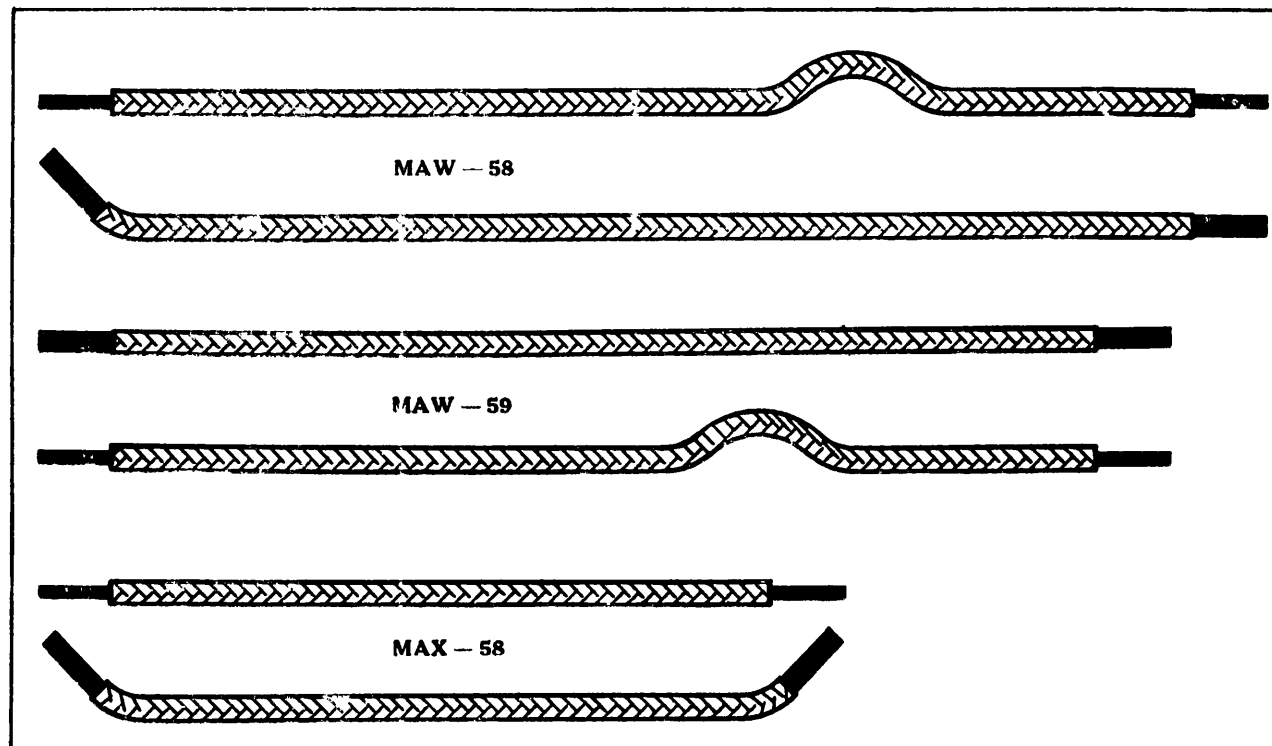


Fig. 3

Full size Drawings of the three Auto-Lite Equalizer Wires for modernizing Series MAW and MAX Starting Motors. To identify a wire match it with the drawing.

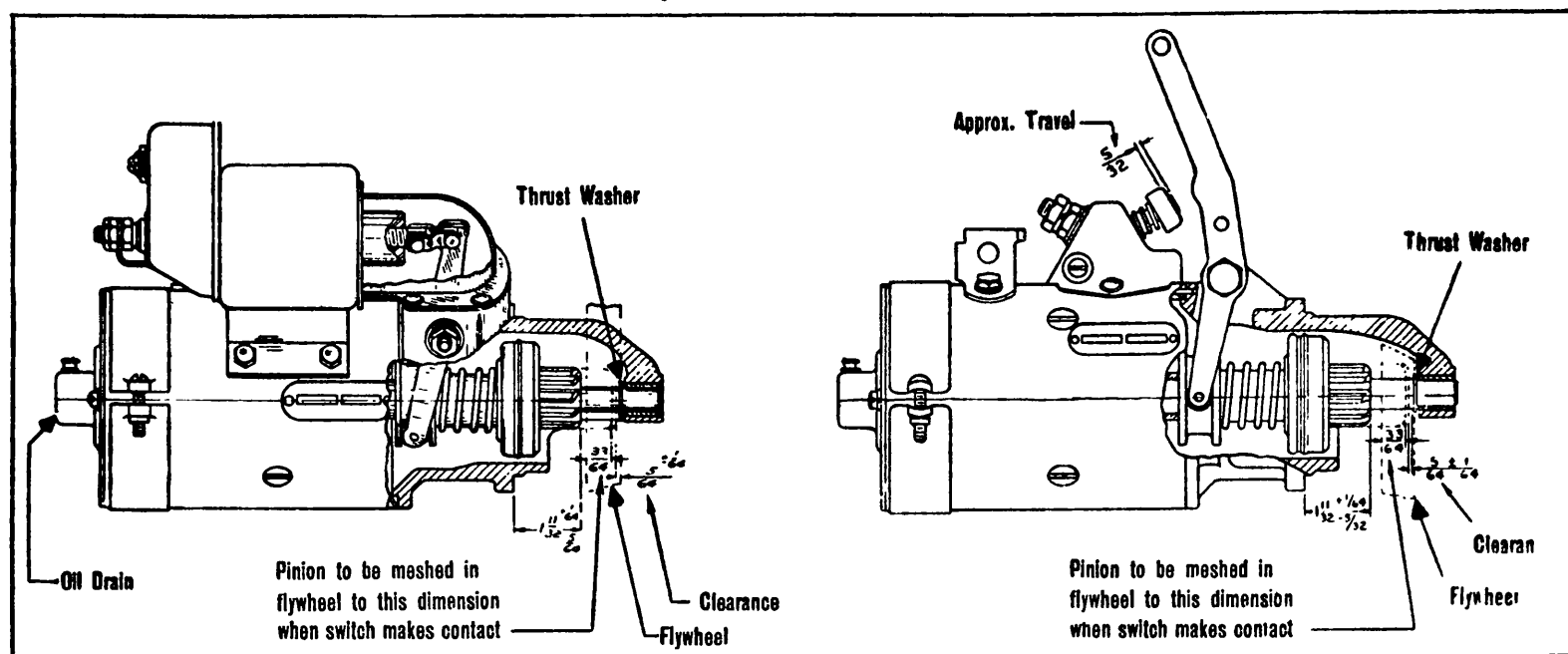


Fig. 4

Fig. 4 is a side view of the MAX-4016 starting motor and solenoid used on the 1936 Chrysler, Model C-7 automobiles. The pinion, when at rest, should check within the limits of $1\frac{11}{32}$ " plus $\frac{1}{64}$ " or minus $\frac{5}{64}$ " when measured from the mounting face of the pinion housing to the outer edge of the pinion. With the solenoid switch closed and the plunger fully bottomed, a clearance of $\frac{5}{64}$ ", plus or minus $\frac{1}{64}$ ", should be maintained between the outer edge of the pinion and the thrust washer next to the outer pinion housing bearing.

In operating the solenoid plunger by hand it will be noted that first the switch contact is made, and then about $\frac{3}{16}$ " further travel bottoms the plunger and brings its outer end about flush with the solenoid housing. To check the $\frac{5}{64}$ " clearance apply pressure against the plunger (not the shift fork) until it bottoms, and then check the clearance between the pinion and thrust washer. Adjust by turning the link in or out as needed. After having adjusted for proper full mesh release the plunger and check the at rest position.

When assembling the terminal post care must be taken that the insulated wire be assembled with the flat side parallel with the end of the

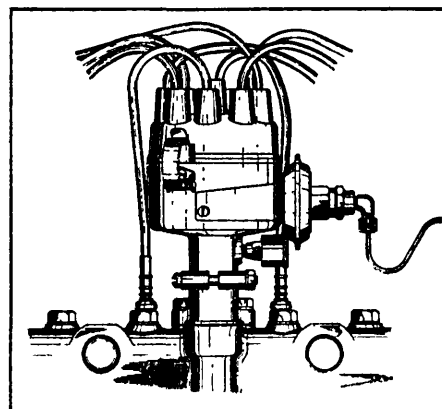
Fig. 5

Fig. 5 is a side view of the MAX-4015 starting motor, with mechanical shift, used on the 1936 DeSoto, Model S-1 automobiles. A clearance of $\frac{5}{64}$ ", plus or minus $\frac{1}{64}$ ", should be had between the pinion outer edge and the thrust washer next to the outer pinion housing bearing when the pinion has been thrown into full mesh position, as controlled by the shift fork. With the pinion in the "at rest" position its outer edge should be $1\frac{11}{32}$ " plus $\frac{1}{64}$ " or minus $\frac{5}{32}$ " from the mounting face of the pinion housing.

Adjustment for the above checks is made by screwing the button on the end of the switch plunger in or out, as necessary. This can be done by pushing the end of the spring down to clear the slot in the switch plunger button. Starting switch plunger travel between "at rest" and "closed" positions should be approximately $\frac{5}{32}$ ".

DELCO-REMY VACUUM CONTROLLED "VACUUMATIC" DISTRIBUTORS

Standard Equipment on 1936 Buick, Cadillac, LaSalle, Oldsmobile and Pontiac Automobiles.



DESCRIPTION

The vacuumatic distributors used on all of the above cars are of the single breaker arm type, which eliminates the necessity of distributor synchronizing. High speed operation is made possible by the use of an especially light breaker arm, in conjunction with a high speed cam which, in the case of eight cylinder distributors, has a "cam angle" (number of distributor shaft degrees during which the breaker points remain closed) of 31 degrees and, in the case of six cylinder distributors, 36 degrees. As a matter of interest, the official 31 degree cam angle, specified by the Delco-Remy engineers, is obtained with a breaker point gap of slightly less than .014 inch. We suggest that eight cylinder, single breaker arm distributors be adjusted with a cam angle of 29 degrees, or a .015 inch contact separation.

Maximum operating efficiency, under all load conditions, has been obtained by combining a vacuum operated spark advance mechanism, controlled by the engine vacuum, with the conventional centrifugal spark advance mechanism (automatic advance) operated by the changes in the distributor shaft speed. The vacuum unit assembly is mounted on the side of the distributor cup, and a link connects the vacuum unit diaphragm to the movable breaker plate which plate, in turn, is mounted on ball bearings, and is free to follow the movements of the diaphragm.

An accurately calibrated coil spring is built into the vacuum unit on the vacuum side of the diaphragm. This spring is compressed when the diaphragm is moved by an increase in the vacuum. An increase in the vacuum results in an increase in the spark advance; however, when the vacuum falls off the spring returns the movable breaker plate to the retarded position.

The vacuum for actuating the diaphragm is obtained thru a copper tube extending to the carburetor. This tube enters the throat of the carburetor JUST ABOVE the upper edge of the throttle valve (on the atmospheric side). Engines idle most smoothly with the spark fully retarded. Because of the fact that the vacuum tube opening is on the atmospheric side of the throttle valve, no vacuum advance takes place, and the spark is fully retarded when the throttle is closed and the engine is idling. This construction also makes it necessary for a car speed of from 16 to 18 miles per hour to be reached before the vacuum advance mechanism becomes operative.

During acceleration or on heavy loads (wide open throttle) the spark advance required to develop maximum engine power is much less than that required for light loads. The centrifugal control (automatic spark advance) can now be calibrated to the requirements for full throttle operation. The additional spark advance necessary for efficient operation at light and medium loads is now supplied by the vacuum advance mechanism.

The solid black line on Fig. 1 shows the centrifugal spark advance (automatic advance) characteristics of the Delco-Remy 663-F distributor used on the 1936 Series 40 Buick automobiles. The dot and dash line on Fig. 1 shows the distributor characteristics when the automatic advance is supplemented by the action of the vacuum advance mechanism.

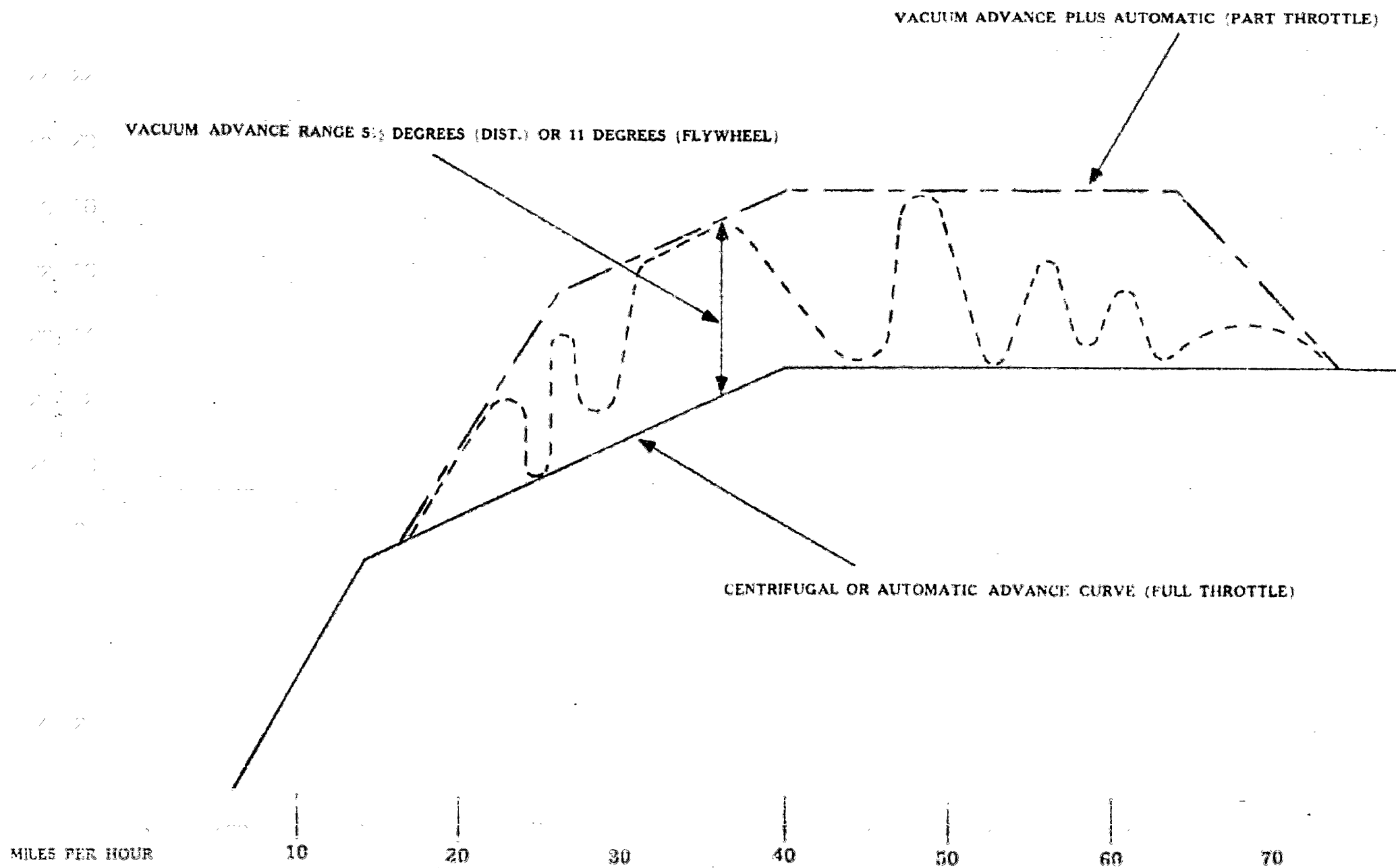
From this chart it will be seen that the vacuum advance mechanism does not become operative until a car speed of approximately 17 miles per hour has been reached. The vacuum advance gradually increases until a maximum of 5 1/2 degrees (distributor) is reached at a car speed of approximately 26 miles per hour. The maximum vacuum advance is maintained until a car speed of, roughly, 64 miles per hour is reached, when the vacuum decreases and the vacuum spark advance gradually falls back until it again becomes fully retarded at a car speed of 74 miles per hour.

The dot and dash curve shown in Fig. 1 is purely theoretical, and would only apply if a car were tested on a long, level, straight-away course and then only with a gradual increase in acceleration extending over a considerable period of time. Actually, the spark advance at any given speed lies somewhere in between the solid line, which pictures the automatic spark advance characteristics, and the dot and dash curve which represents the maximum advance possible by combining the automatic and vacuum advances. At just what point the spark takes place depends upon operating conditions; that is, whether the engine is being rapidly accelerated or is drifting along under a light load. The distributor vacuum advance mechanism is constantly in motion, and follows every movement of the foot accelerator.

The dotted curved line is purely representative, and pictures what would take place under a certain set of driving conditions. It is brought to your attention simply to show the flexibility of vacuum spark controlled distributors and, at the same time, to im-

Fig. 1

Characteristics of the Delco-Remy 663-F "Vacuumatic" Distributor
used on the 1936 Series 40 Buick Automobiles



upon the reader the tremendous amount of motion to which the breaker plate is constantly subjected, which ultimately will result in wear and a demand for a complete distributor overhaul.

PROCEDURE TO FOLLOW WHEN OVERHAULING AN EIGHT CYLINDER DELCO-REMY "VACUUMATIC" DISTRIBUTOR

It will be found that there are some fifty or more small parts, consisting of screws, lock washers, flexible leads, bushings, etc., which will be handled during the overhauling operation. Our engineers have found that if a certain definite procedure is followed, both when tearing down as well as when again assembling a distributor, the time required for performing the work will be reduced to a minimum, and no difficulties will be experienced in returning the many parts to the places where they belong.

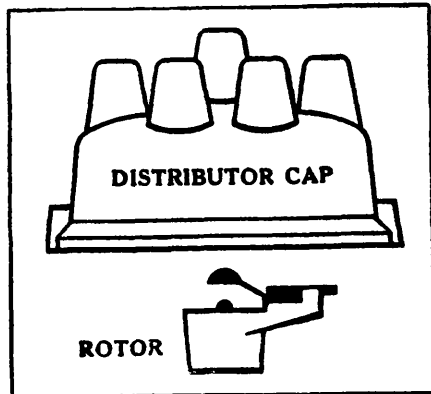


Fig. 2

Remove Distributor Cap and Rotor.

when the breaker plate is again fitted into the distributor cup. With the breaker arm and spring removed, room is provided for working on the insulated terminal stud nut and assembly.

5. Remove the insulated terminal stud nut ("F", Fig. 5) and slip terminal stud out thru side of the distributor cup, and then lift out the inside insulating bushing and lock washer from the distributor cup

6. Remove distributor cap support screw ("G", Fig. 6) which holds one end of the flexible ground lead to the inside of the distributor cup, and screw "H", which holds the other end of the lead to the breaker plate.

1. After removing the entire distributor assembly from the engine, thoroughly wash and dry the outside of the unit. Clamp the distributor in your Oscillograph or Syncrograph fixture; however, if your shop is not equipped with one of these devices, hold the distributor in a vise. This is an important detail.

2. Remove distributor cap and rotor (Fig. 2).

3. Remove the condenser hold-down screw ("A", Fig. 3) and the condenser lead screw ("B", Fig. 3), and then remove condenser from the distributor.

4. Loosen breaker arm spring attaching screw ("C", Fig. 4) just enough to permit the breaker arm and spring to be lifted up and out of the distributor.

IMPORTANT: Do not run nut ("D", Fig. 4) entirely off of screw "C", as much time will be saved when assembling the distributor if this group of parts is already in place

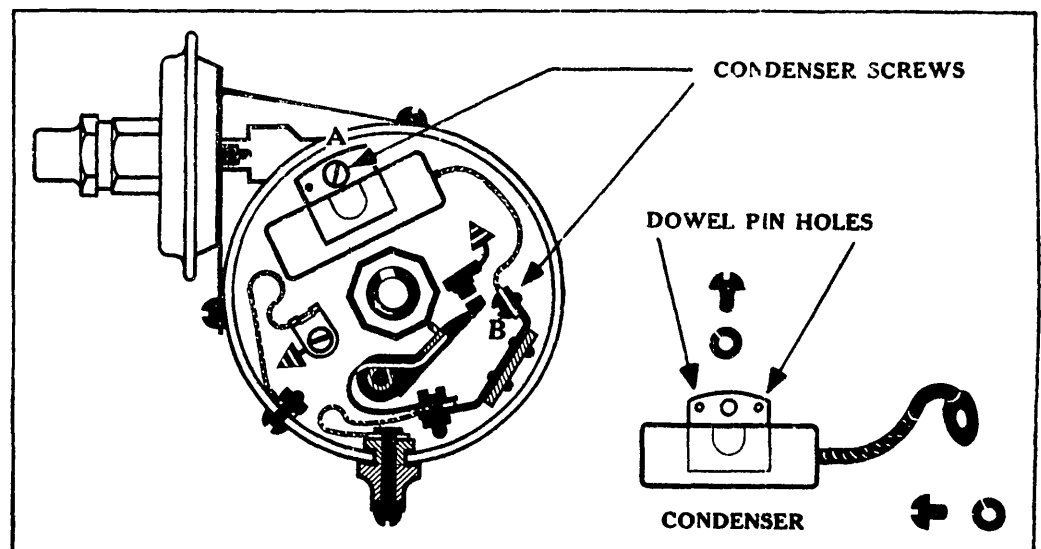


Fig. 3

Remove Condenser Hold-Down and Lead Screws.

IMPORTANT! Thread nut "I" back onto screw "G" to avoid mixing this screw with others. While it has the same number of threads, and is the same wire size as the breaker plate hold-down screws, it is $\frac{3}{8}$ " long, while the hold-down screws are but $\frac{1}{4}$ " in length.

7. Remove the remaining blued breaker plate hold-down screws ("J", "K" and "L", Fig. 7), firmly grasp the breaker arm pivot stud by the thumb and forefinger, and carefully lift the breaker plate assembly up and out of the distributor cup.

IMPORTANT: In lifting the breaker plate watch for the three steel balls

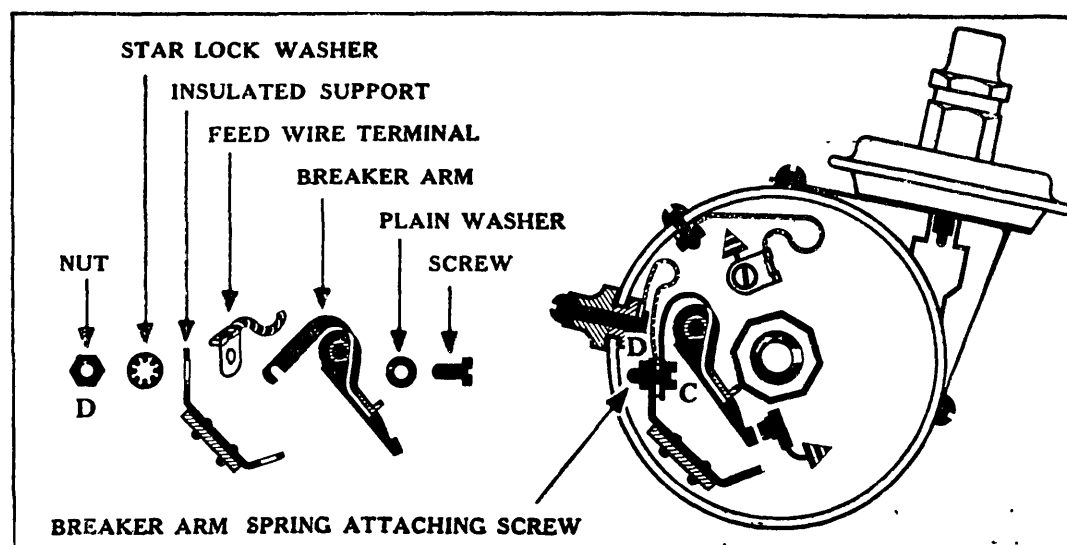


Fig. 4

Loosen Breaker Arm Spring Attaching Screw.

found below the plate, to see that they remain in place. It frequently happens that one or more of the balls stick to the bottom of the breaker plate, when it is removed, and either drop on the floor or otherwise become lost during this operation.

8. With a pair of long nose tweezers remove the three steel balls ("M", "N" and "O", Fig. 8), and lift the ball bearing retainer plate from the distributor cup.

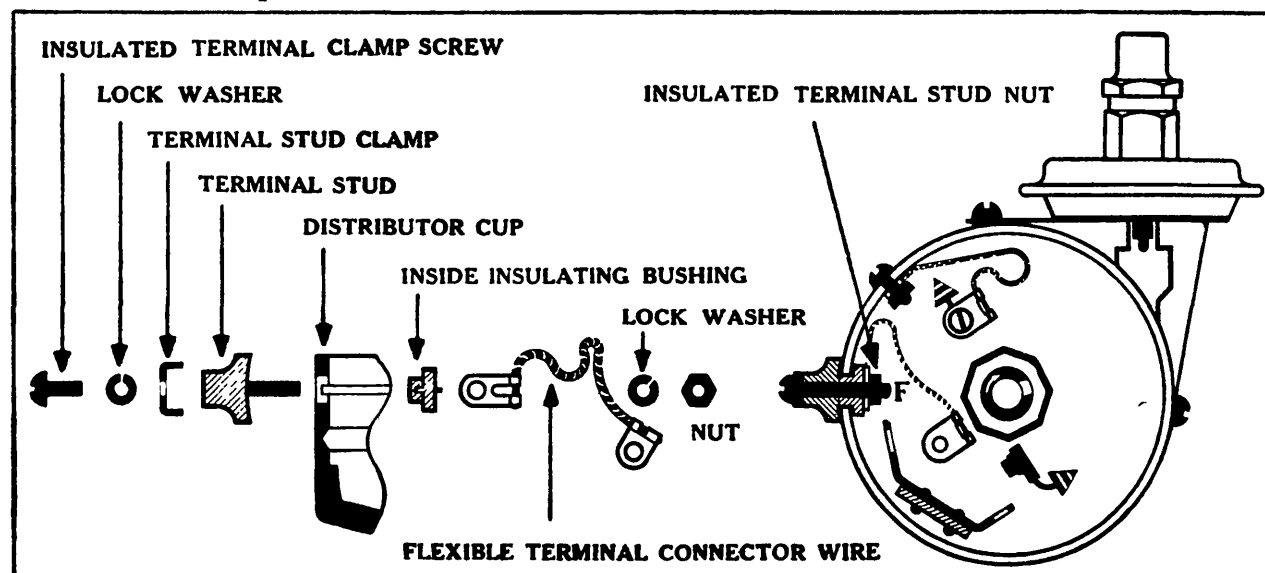


Fig. 5
Remove Insulated Terminal Stud Nut.

9. Remove the three vacuum control attaching screws ("P", "R" and "S", Fig. 9), and the vacuum control unit may then be detached from the side of the distributor cup.

INSPECT FOLLOWING PARTS FOR WEAR.

1. Make a careful inspection of the ball race groove in the distributor cup ("T", Fig. 10) for signs of wear. Inspect slots ("U", "V" and "W", Fig. 10) in ball bearing retainer plate for signs of wear.

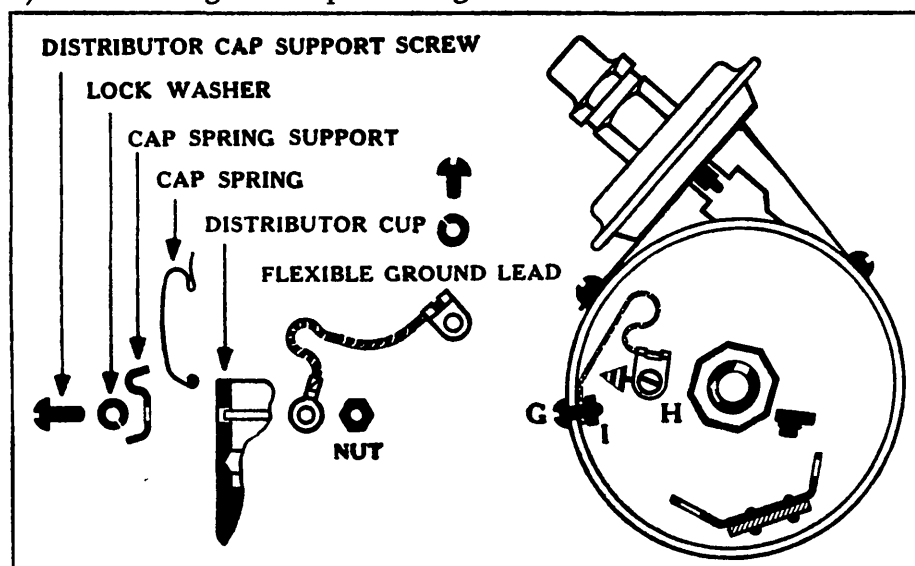


Fig. 6
Remove Distributor Cap Support Screw from side of Distributor Cup, as well as the screw which holds Flexible Ground Lead to the Breaker Plate.

IMPORTANT: A slight amount of wear in either the distributor cup or retainer plate will cause an error of from 5 to 6 degrees in the vacuum advance characteristics.

2. Inspect governor action by holding the distributor shaft and turning the cam in the direction of rotation. Action should be smooth and even. Oil the wick in top of distributor shaft. It is needless to mention that the distributor bearings and shaft should be firm and not show signs of wear.

3. Inspect spring on bottom of breaker plate assembly. Make sure the spring is not worn or cracked. The distance between the bottom of the breaker plate and the top of the spring should not be less than 5/16 inches. It should require a pull of at least eight ounces to cause the spring to deflect (see Fig. 11).

4. Inspect both the flexible terminal connector wire and the flexible ground lead for signs of broken strands (see Fig. 12). Our engineers recommend that these two wires be replaced with new genuine Delco-Remy (or Auto-Lite if an Auto-Lite unit) wires, each time a distributor is overhauled.

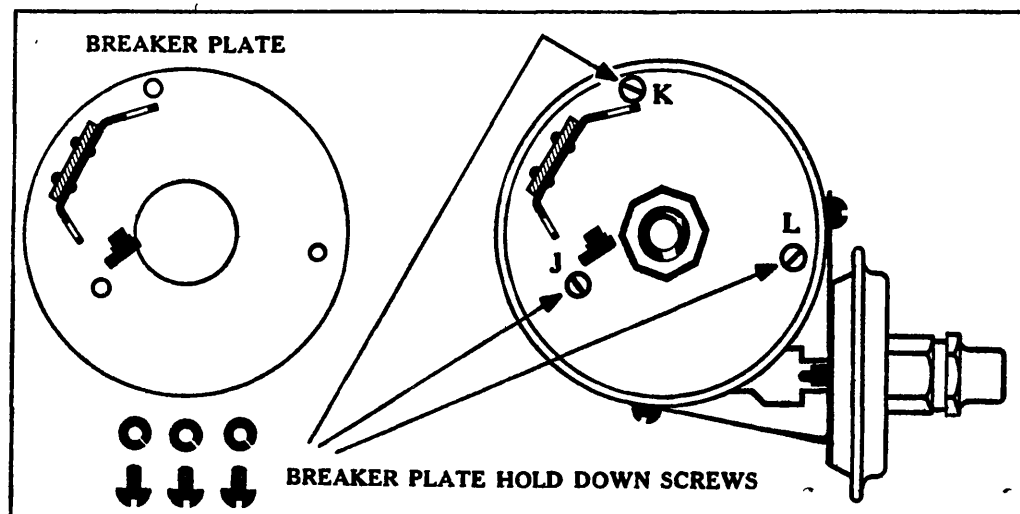


Fig. 7

Remove remaining screws from Breaker Plate, and lift out the Plate.

ground leads and two each of the others, and is priced at \$1.00.

IMPORTANT: Check your leads against the drawings (lay the wire right on the drawing), and use the correct leads for the distributor on which you are working.

TO ASSEMBLE.

1. Replace vacuum control unit.
2. Refer to Fig. 14. Drop ball bearing retainer plate into distributor cup, making sure that slot "X" is directly over hole "Y" in vacuum control unit lever, and that the three ears "U", "V" and "W" on the breaker plate, come to rest on the projecting shelf "AA" in bottom of distributor cup.

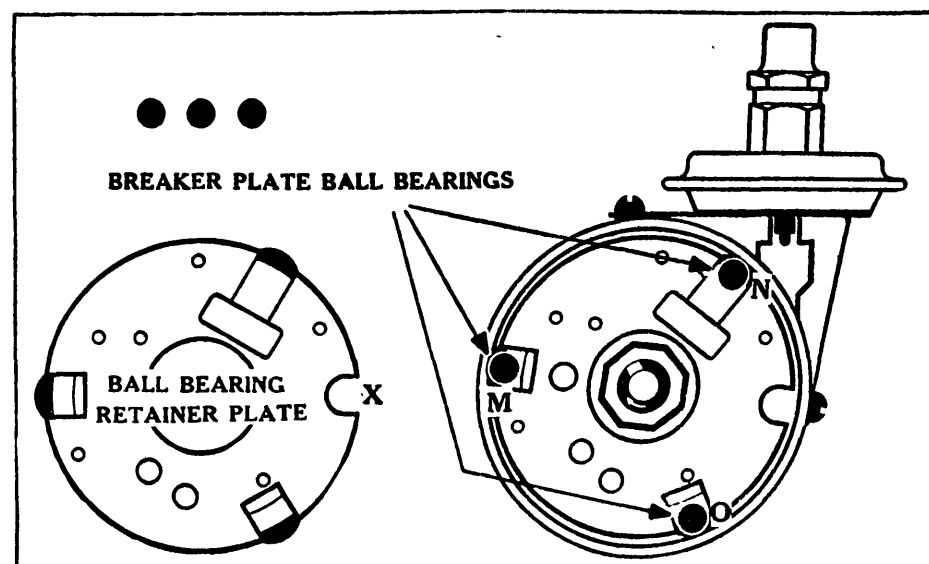


Fig. 8

Remove the three Steel Balls and lift out the Ball Bearing Retainer Plate.

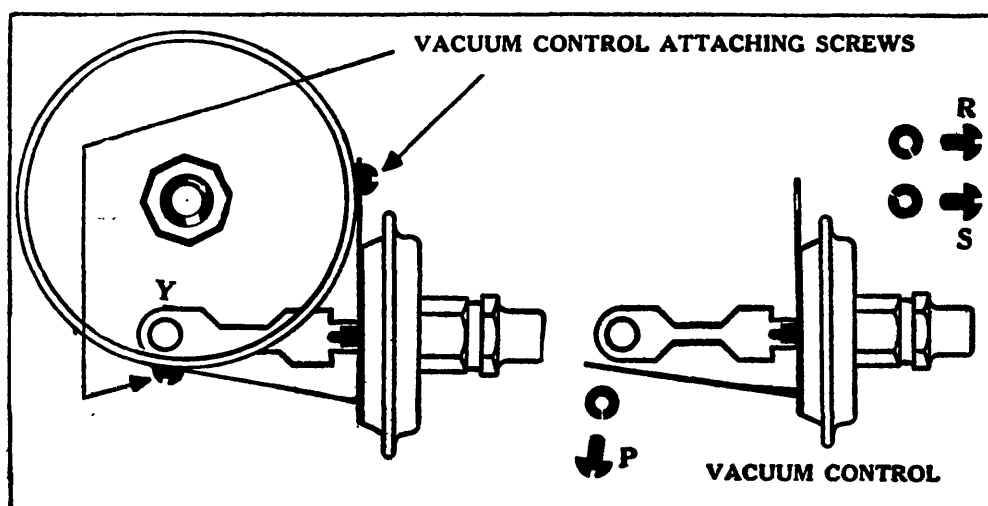


Fig. 9

Remove Vacuum Control Attaching Screws and detach Unit from side of Distributor Cup.

WARNING: Do not be tempted to make up make-shift leads out of brush pig tails or electric light fixture wire. To do so is to "court disaster". Bear in mind that the breaker plate in these distributors is constantly in motion, and the leads are constantly being twisted. Unless a special annealed wire is used the strands will soon crystallize and break.

Fig. 13 shows full size drawings of all flexible leads used at the present time by Auto-Lite and Delco-Remy. For the convenience of our subscribers we are offering an assortment of 14 flexible leads (10 Delco-Remy and 4 Auto-Lite), which assortment provides complete coverage. This assortment consists of four No. 1853288

3. Smear the three steel balls with vaseline, and drop them into place (see Fig. 8).

4. Hold the breaker plate by the breaker arm pivot, and carefully return the plate to its place in the distributor cup, making sure that the pin on bottom of the breaker plate drops thru the slot in the ball bearing retainer plate, and into the hole in end of vacuum control lever.

IMPORTANT: Because of the spring under the breaker plate the plate will not be flat in the distributor cup when it comes to rest but will be at a slight angle.

5. The first screw to replace in the breaker plate is the one which goes in the hole close to the stationary breaker point ("BB", Fig. 15). When this screw is tightened the breaker plate will come down into place.

6. Follow with the remaining breaker plate screws and tighten each one securely.

7. With the thumb and forefinger turn the breaker plate to make sure it is not cramped, stuck or binding.

8. Attach flexible ground lead. Refer to Fig. 6 for order in which parts are assembled, and the end of the flexible lead which should be attached to the breaker plate.

9. Assemble the insulated terminal stud. Refer to Fig. 5 for order in which parts should go.

WARNING: Just bring the insulated terminal stud nut up to a snug fit. If undue force is used in tightening this nut the moulded bushing will split and the stud will pull thru and out.

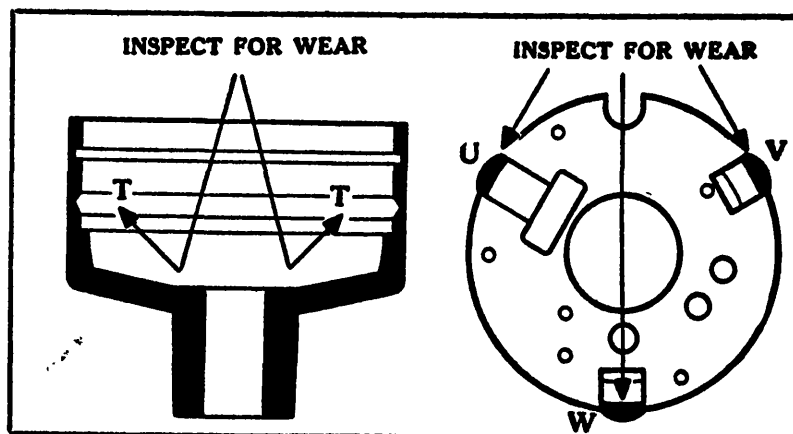


Fig. 10

Inspect Distributor Cup and Retainer Plate for signs of wear.

IMPORTANT: Fig. 16 shows a detail of the inside insulating bushing. From this drawing it will be seen that there is a moulded key ("CC") on the bushing which fits into the groove ("DD") cut in the distributor cup. On the inside face of this bushing there is a dowel pin which fits thru the slot ("EE") in the terminal of the flexible connector wire. This construction makes it impossible for the wire terminal to turn when the nut is tightened, possibly grounding the distributor thru the breaker plate. Note that the terminal is so attached that the wire points "up" when assembled.

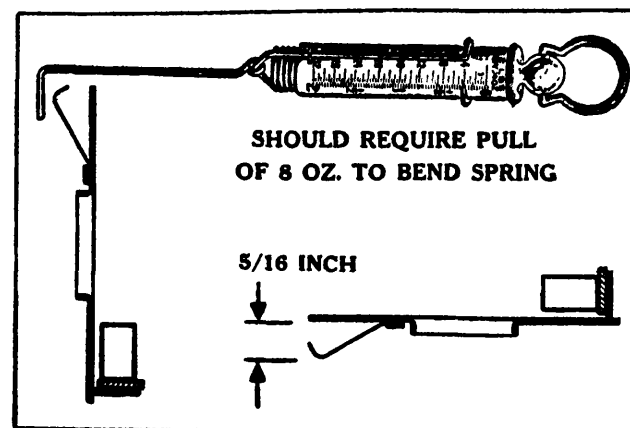


Fig. 11

Inspect Breaker Plate Spring and test for tension.

10. Replace breaker arm and spring; tighten breaker arm spring attaching screw. If this screw was completely removed when the distributor was disassembled refer to Fig. 4 for order in which the parts should be assembled. Fig. 17 shows how the terminal on the flexible wire should fit over the insulated support.

11. Tension the breaker arm spring by changing the position of the attaching screw in the elongated slot (proper tension should be between 19 and 23 oz.), and line up the breaker points.

12. Replace con-

13. The final and, perhaps, most important assembly operation is to carefully adjust the flexible terminal connector wire, forming it around into a position which will permit it

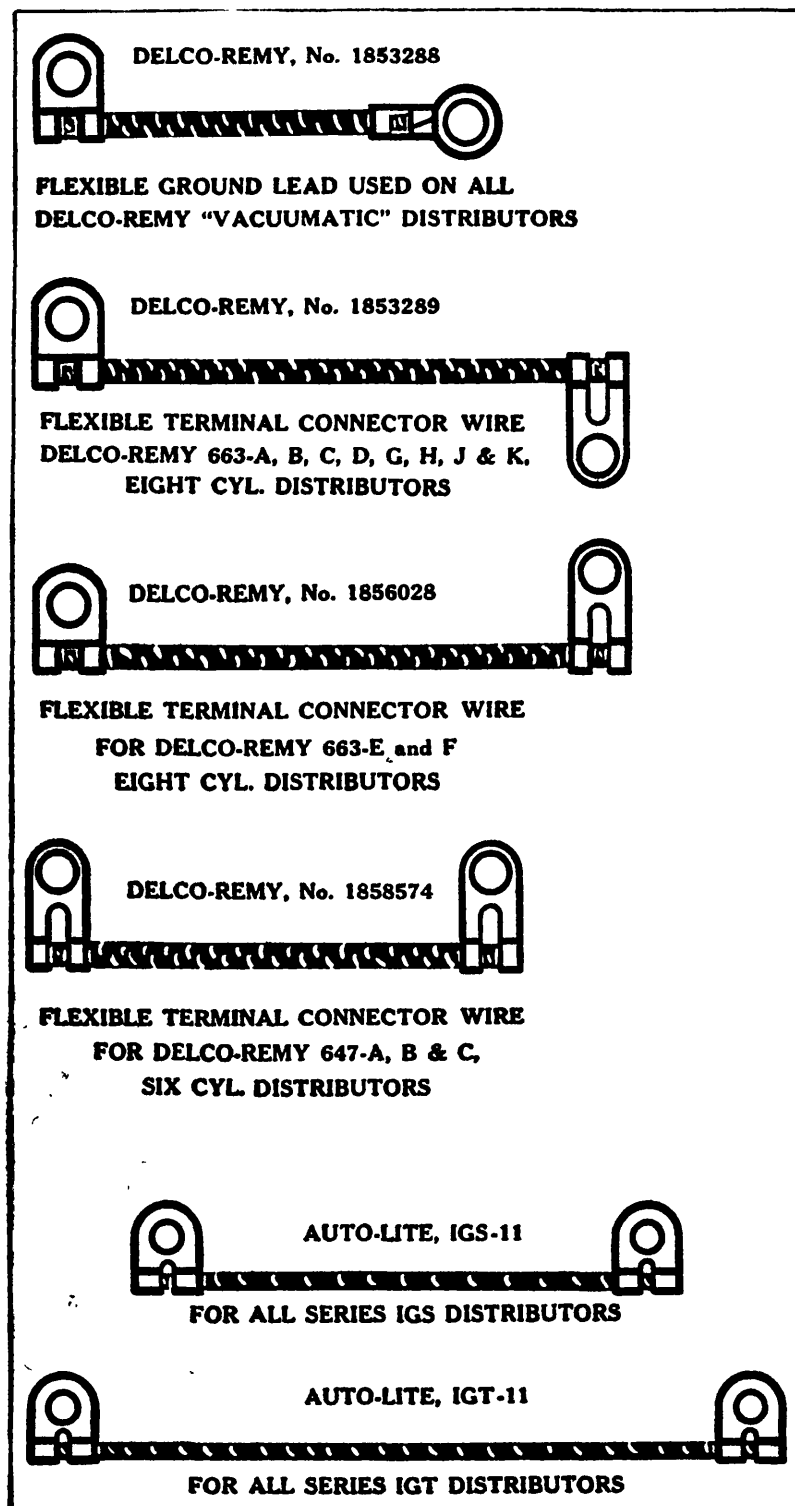


Fig. 13

Full size drawings of the six Flexible Leads used by Auto-Lite and Delco-Remy. To identify a lead, match your wires with the drawing. Pay particular attention to the Terminals on the Leads, and make sure that they point in the right direction.

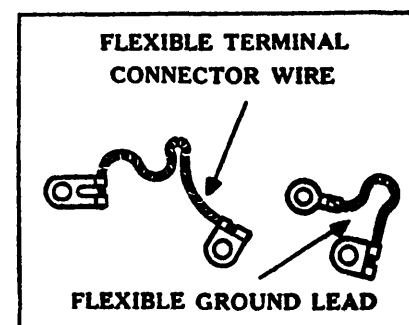


Fig. 12

Inspect Flexible Leads for frayed or broken strands.

to bend as the breaker plate moves but not chafe against the distributor cup. Make sure it is pressed down into place, and does not "ride high" and touch the rotor.

FINAL DISTRIBUTOR TEST.

1. Set cam angle to correct value.
2. Run test on automatic spark advance, checking values against characteristics specified for the particular unit.

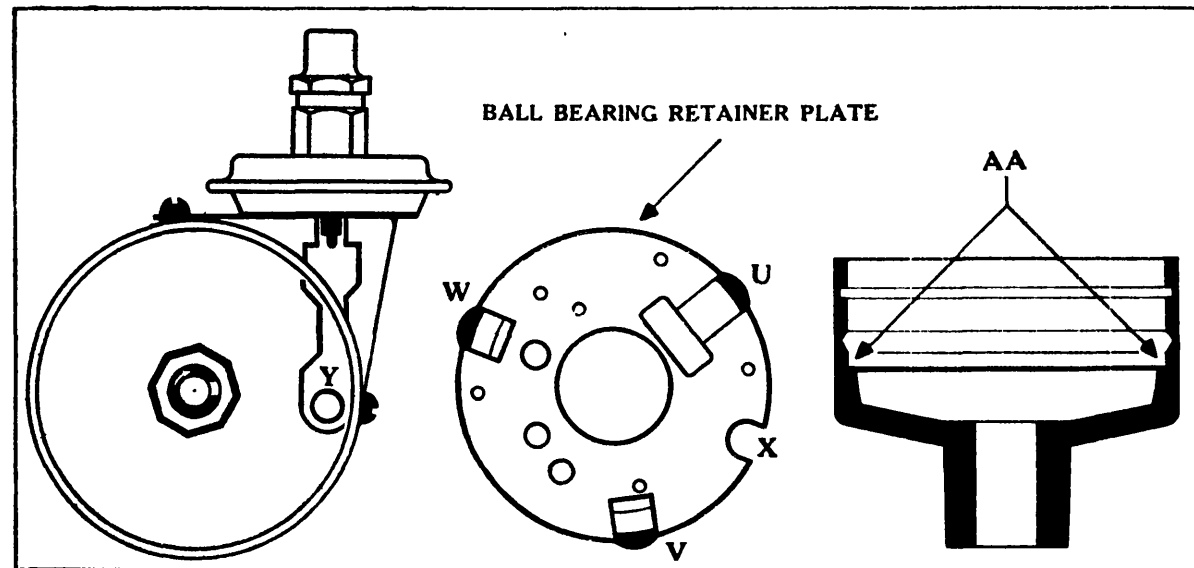


Fig. 14

The Slot "X" in Ball Bearing Retainer Plate should come directly over Hole "Y" in Vacuum Control Unit Lever.

3. Run distributor in an Oscillograph or Syncrograph at a speed below that at which the automatic advance spark starts, or at a speed above that at which the maximum automatic spark advance is reached.
4. Apply a vacuum to the vacuum control unit, and determine the maximum vacuum advance
5. Check the distributor cam angle when the distributor has the maximum vacuum advance.

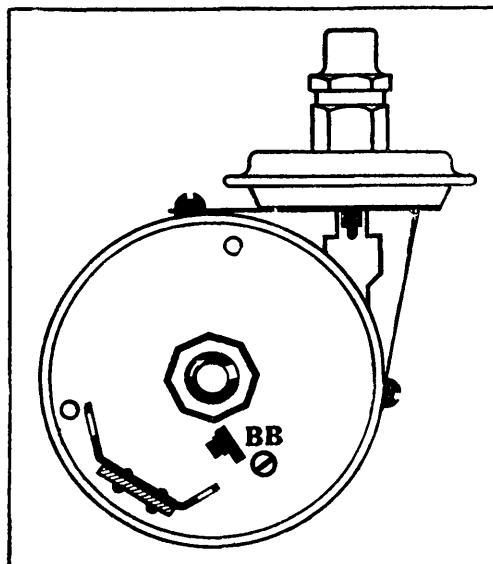


Fig. 15

The Breaker Plate Screw, located close to the Stationary Point, should be assembled first.

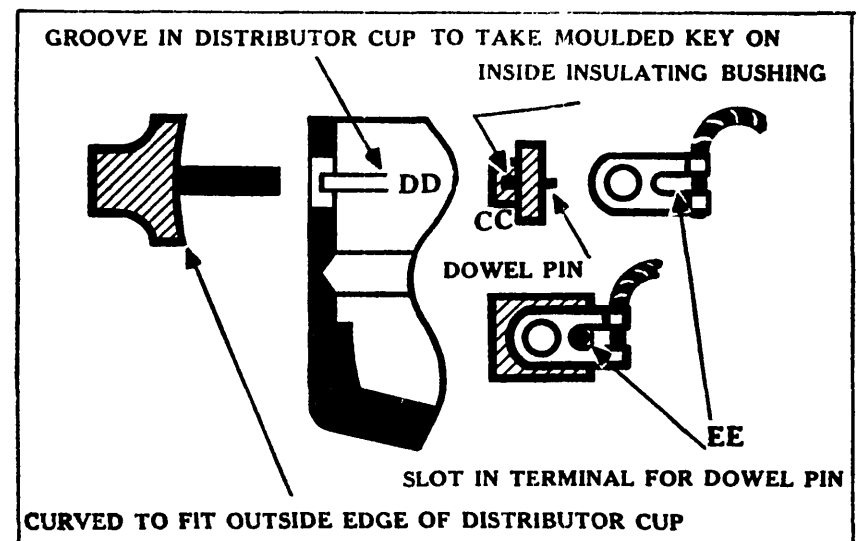


Fig. 16

The moulded Key on the inside Bushing fits into a groove cut in the Distributor Cup, while the Moulded Dowel Pin fits thru the Slot in the Lead Terminal.

IMPORTANT: The distributor cam angle should not change more than plus or minus 1 degree throughout the entire vacuum advance range. If an error of more than plus or minus 1 degree is found it is an indication of worn parts, or possibly a weak spring under the breaker plate, or even improper assembly.

WARNING: Do not attempt to check the action or range of the vacuum advance mechanism by moving the breaker plate by hand. If you do not have facilities for creating a variable vacuum of from zero to twenty inches of mercury, when it comes to testing the vacuum unit, take the distributor to a shop that has, or else use the vacuum from the intake manifold of another engine.

PROCEDURE TO FOLLOW WHEN OVERHAULING A SIX CYLINDER, DELCO-REMY "VACUUMATIC" DISTRIBUTOR

The construction of the six cylinder Delco-Remy "vacuumatic" distributor is somewhat different from that of the eight cylinder units, just described, in that the breaker plate and ball bearing retainer plate are riveted together. In order to remove the breaker plate assembly it is first necessary to remove the vacuum control attaching screws ("P", "R" and "S", Fig. 9). With these three screws removed the vacuum control chamber may be pulled in and, which, in turn, will rotate the breaker plate assembly a small amount.

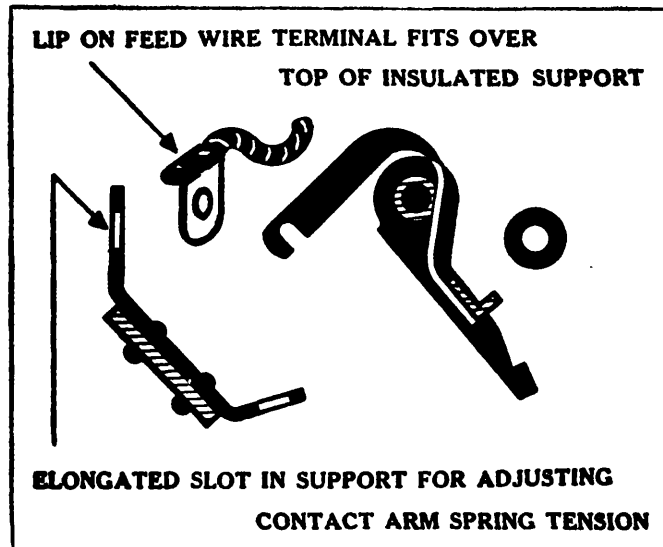


Fig. 17

Detail drawing showing how the Feed Wire Terminal should fit over the Insulated Support.

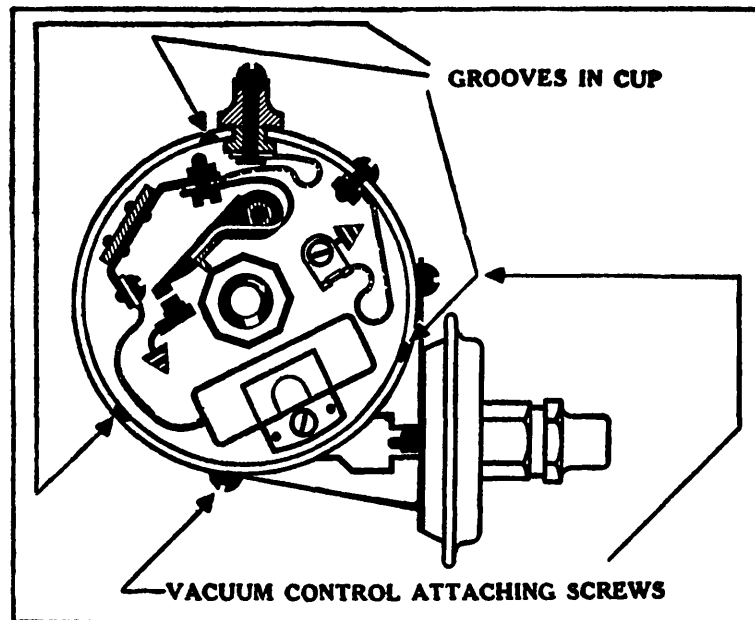


Fig. 18

Top view of Distributor with Cap and Rotor removed. Note the three vertical grooves cut in side of the Distributor Cup.

By inspecting the top of the distributor cup (see Fig. 18) it will be seen that there are three half-round vertical grooves, cut on the inside of the cup, spaced one hundred and twenty degrees apart. With the vacuum chamber loose the breaker plate may be turned sufficiently to permit the three breaker plate ball bearings to line up with the three grooves, at which time the entire breaker plate assembly may be lifted up and out of the distributor.

WARNING: Watch out for the three steel balls when the breaker plate is lifted out, as there is nothing to keep the balls in place when the plate assembly is removed from the cup.

When reassembling the unit, fill the ball bearing retaining pockets with light grease or vaseline, in order to stick the balls, while the assembly is being lowered down into place in the distributor cup.

PROCEDURE TO FOLLOW WHEN CHANGING THE VACUUM CONTROL CHAMBER ON EITHER THE SIX OR EIGHT CYLINDER DELCO-REMY "VACUUMATIC" DISTRIBUTORS

The vacuum chamber on either the six or eight cylinder distributors may be changed without disturbing the condenser, breaker points, leads, or other parts of the distributor, by first removing the three vacuum control attaching screws ("P", "R" and "S", Fig. 9) and then rotating the breaker plate sufficiently to allow the three ball bearings to register with the three vertical grooves cut in the distributor cup. The breaker plate may then be lifted just enough to allow the actuating stud on the bottom of the plate to be disengaged from the hole in the vacuum control link ("Y", Fig. 9). The control assembly may then be removed from the distributor cup.

1935 Valve and Ignition Timing Specifications

Compiled by Weidenhoff Engineers for use with
Weidenhoff Motor Gauge

1935 Passenger Cars	Adapter	Rod	Stroke	Ignition Timing	Before or After T.D.C.	Spark Retard, Advance or Set	Intake Valve Opens	Before or After T.D.C.	Firing Order	Valve Clearances				Breaker Contact Separation	Spark Plug Gap (Ins.)
										Timing		Running			
										Int.	Exh.	Int.	Exh.		
AUBURN (653).....	114	42	4 3/4	.004	B.T.C.	Ret.	.011	B.T.C.	1-5-3-6-2-4	.010	.010	.006	.006	.018	.025
" (851).....	105	5	4 3/4	.004	B.T.C.	Ret.	.011	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.006	.006	.013	.025
BUICK 40.....	113	31	3 3/4	.001	B.T.C.	Adv.	.008	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.008	.008	.013	.020
" 50.....	113	38	4 1/4	.020	B.T.C.	Adv.	.008	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.008	.008	.013	.020
" 60.....	113	31	4 3/4	.053	B.T.C.	Adv.	.009	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.008	.008	.013	.020
" 90.....	113	31	5	.047	B.T.C.	Adv.	.010	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.008	.008	.013	.020
CADILLAC (355-D).....	104	42	4-15/16	.009	B.T.C.	Adv.	.017	B.T.C.	1-2-7-8-4-5-6-3	.006	.004	.006	.010	.013	.025
" (370-D).....	113	33	4	.006	B.T.C.	Adv.	T.D.C.	.....	1-4-9-8-5-2-11-10-3-6-7-12	A	A	A	A	.018	.025
" (452-D).....	113	33	4	.006	B.T.C.	Adv.	T.D.C.	.....	{ 1-8-9-14-3-6-11-2-15- 10-7-4-13-12-5-16	A	A	A	A	.014	.025
CHEVROLET Master.....	113*	33	4	.012	B.T.C.	Adv.	.006	B.T.C.	1-5-3-6-2-4	.006	.013	.006	.013	.021	.032
" Standard.....	113*	33	4	.009	B.T.C.	Adv.	.006	B.T.C.	1-5-3-6-2-4	.006	.013	.006	.013	.021	.032
CHRYSLER (C-6) AS.....	114-103	42-12	4 1/4	T.D.C.	.....	Set	T.D.C.	.....	1-5-3-6-2-4	.010	.010	.006	.008	.020	.025
" (CZ-8) AS.....	114-103	42-12	4 1/4	T.D.C.	.....	Set	T.D.C.	.....	1-6-2-5-8-3-7-4	.011	.012	.006	.008	.018	.025
" (C1-8) AF.....	114-103	42-12	4 1/4	T.D.C.	.....	Set	T.D.C.	.....	1-6-2-5-8-3-7-4	.011	.012	.006	.008	.018	.025
" (C2-8) AF.....	114-103	42-12	4 1/4	.012	A.T.C.	Set	.011	A.T.C.	1-6-2-5-8-3-7-4	.011	.012	.006	.008	.018	.025
" (C3-8) AF.....	114-103	42-12	5	.012	A.T.C.	Set	.012	A.T.C.	1-6-2-5-8-3-7-4	.008	.008	.009	.009	.018	.025
DE SOTO (SE-6).....	114	12	4 1/4	.004	A.T.C.	Ret.	T.D.C.	.....	1-5-3-6-2-4	.010	.010	.006	.008	.020	.025
" (SG-6).....	114	12	4 1/4	.004	A.T.C.	Ret.	T.D.C.	.....	1-5-3-6-2-4	.010	.010	.006	.008	.020	.025
DODGE (DU-6).....	114-103	42-12	4 3/4	.005	A.T.C.	Ret.	.015	A.T.C.	1-5-3-6-2-4	.011	.012	.006	.008	.020	.025
DUESENBERG (8-A).....	104	8	4 3/4	.049	B.T.C.	Adv.	.015	B.T.C.	1-6-2-5-8-3-7-4	.025	.025	.025	.025	.024	.025
FORD V-8.....	104	40	3 3/4	.006	B.T.C.	Set	.032	B.T.C.	1-5-4-8-6-3-7-2	.013	.013	.013	.013	.015	.025
GRAHAM (8-74).....	102	2	4	.006	B.T.C.	Adv.	.001	B.T.C.	1-5-3-6-2-4	.012	.012	.010	.010	.018	.025
" Special (8-73).....	102	2	4 1/2	.004	B.T.C.	Adv.	T.D.C.	.....	1-5-3-6-2-4	.012	.012	.010	.010	.018	.025
" (8-72).....	102	40	4	.003	B.T.C.	Adv.	T.D.C.	.....	1-6-2-5-8-3-7-4	.012	.012	.010	.010	.018	.025
" Super (8-75).....	104	40	4	.003	B.T.C.	Adv.	T.D.C.	.....	1-6-2-5-8-3-7-4	.012	.012	.010	.010	.018	.025
HUDSON.....	114	44	5	T.D.C.*	.....	Adv.	.040	B.T.C.	1-5-3-6-2-4	.010	.010	.006	.008	.020	.022
".....	114	44	4 1/4	T.D.C.*	.....	Set	.052	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.006	.008	.018	.022
HUPMOBILE (518-D).....	104	2	4 1/4	.020*	B.T.C.	Adv.	.002	B.T.C.	1-5-3-6-2-4	.....	.....	.010	.013	.018	.028
" (521-O).....	104	2	4 1/4	.022*	B.T.C.	Adv.	.004	A.T.C.	1-4-7-3-8-5-2-6	.....	.....	.018	.018	.021	.028
" (527-T).....	104	2	4 1/4	.022*	B.T.C.	Adv.	.004	A.T.C.	1-4-7-3-8-5-2-6	.....	.....	.018	.018	.021	.028
LAFAYETTE (6-3510).....	104	40	4 3/4	.041	B.T.C.	Adv.	.....	.....	1-5-3-6-2-4	.015	.015	.008	.008	.020	.025
LA SALLE.....	104	40	4 1/4	.026	B.T.C.	Adv.	.015	A.T.C.	1-6-2-5-8-3-7-4	.015	.015	.006	.008	.018	.025
LINCOLN V-12.....	104	40	4 1/4	.021	B.T.C.	Adv.	.186	B.T.C.	1-4-9-8-5-2-11-10-3-6-7-12	.003	.005	.003	.005	.020	.025
NASH (3520).....	113*	37	4 3/4	.093	B.T.C.	Adv.	.....	.....	1-5-3-6-2-4	.015	.015	.015	.015	.020	.025
" (3510 and 3840).....	104	40	4 1/4	.041	B.T.C.	Adv.	.....	.....	1-5-3-6-2-4	.015	.015	.008	.008	.020	.025
" (3530).....	113*	37	4 1/4	.090	B.T.C.	Adv.	.....	.....	1-6-2-5-8-3-7-4	.015	.015	.015	.015	.020	.025
" (3530).....	113	31	4 1/4	.096	B.T.C.	Adv.	.....	.....	1-6-2-5-8-3-7-4	.015	.015	.015	.015	.020	.025
OLDSMOBILE 6.....	104	40	4 1/4	.001	B.T.C.	Adv.	.010	B.T.C.	1-5-3-6-2-4	.010	.010	.008	.010	.018	.025
" 8.....	104	2	4 1/4	.004	B.T.C.	Adv.	T.D.C.	.....	1-6-2-5-8-3-7-4	.010	.010	.008	.010	.018	.025
PACKARD 120.....	114	5	3 3/4	.009	B.T.C.	Adv.	.009	B.T.C.	1-6-2-5-8-3-7-4	.....	.....	.007	.009	.018	.025
" 8.....	114	5	5	.017	B.T.C.	Adv.	.412	B.T.C.	1-6-2-5-8-3-7-4	.....	.....	.004	.006	.018	.025
" Super 8.....	114	5	5	.017	B.T.C.	Adv.	.412	B.T.C.	1-6-2-5-8-3-7-4	.....	.....	.004	.006	.018	.025
" 12.....	114	2	4 1/4	.026	B.T.C.	Adv.	T.D.C.	.....	{ 1R-6L-5R-2L-3R-4L- 6R-1L-2R-5L-4R-3L	.....	.....	A	A	.018	.025
PIERCE-ARROW 845.....	114	29	5	.030	B.T.C.	Adv.	.012	A.T.C.	1-6-2-5-8-3-7-4	.004	.006	A	A	.018	.022
" 1245.....	114	42	4	.024	B.T.C.	Adv.	.030	B.T.C.	1-4-9-8-5-2-11-10-3-6-7-12	.004	.006	A	A	.018	.022
" 1255.....	114	42	4	.024	B.T.C.	Adv.	.030	B.T.C.	1-4-9-8-5-2-11-10-3-6-7-12	.004	.006	A	A	.018	.022
PLYMOUTH 6.....	114-103	42-12	4 3/4	.004	A.T.C.	Adv.	.015	A.T.C.	1-5-3-6-2-4	.011	.012	.006	.008	.020	.025
PONTIAC Six.....	114	42	3 3/4	.030	B.T.C.	Adv.	.009	B.T.C.	1-5-3-6-2-4	.010	.010	.009	.009	.018	.025
" Eight.....	114	42	3 3/4	.027	B.T.C.	Adv.	T.D.C.	.....	1-6-2-5-8-3-7-4	.010	.010	.009	.009	.018	.025
REO 6-A.....	104	2	4 1/4	.012	B.T.C.	Set	T.D.C.	.....	1-5-3-6-2-4	.012	.012	.007	.008	.020	.025
" 8.....	104	2	5	.014	B.T.C.	Set	T.D.C.	.....	1-5-3-6-2-4	.012	.012	.007	.008	.020	.025
STUDEBAKER Dict. 6.....	104	2	4 1/4	T.D.C.	.....	Adv.	.088	B.T.C.	1-5-3-6-2-4	.010	.010	.004	.006	.020	.023
" Comm. 8.....	104	2	4 1/4	T.D.C.	.....	Set	.090	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.004	.006	.020	.023
" Pres. 8.....	104	2	4 1/4	T.D.C.	.....	Set	.090	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.004	.006	.020	.023
STUTZ SV-16.....	113	31	4 1/4	.086	B.T.C.	Adv.	.001	B.T.C.	1-6-2-5-8-3-7-4	.028	.028	.028	.028	.017	.025
" DV-32.....	104	8	4 1/4	.152	B.T.C.	Adv.	.009	B.T.C.	1-6-2-5-8-3-7-4	.046	.046	.046	.046	.020	.022
TERRAPLANE 6.....	114	43	5	T.D.C.	.....	Set	.057	B.T.C.	1-5-3-6-2-4	.010	.010	.006	.008	.018	.022
WILLYS 77.....	104	2	4 3/4	.007	B.T.C.	Set	T.D.C.	.....	1-3-4-2	.010	.010	.004	.006	.018	.024

EXPLANATION OF ABBREVIATIONS

Adv.—Advanced Spark
A.—Automatic Take-up

B.T.C.—Before Top Center
A.T.C.—After Top Center

H—Hot
O—Cold

T.D.C.—Top Dead Center
Ret.—Retarded Spark

*Chevrolet Master & Standard—Use No. 113 Adapter with No. 152 Adapter.

*Hudson and Hupmobile cars must be timed from rear cylinder.

*Nash—3520 and 3580 use No. 113 Adapter with No. 152 Adapter plus No. X4615 Collar.

Note—On Cars using 14 mm. spark plugs, first insert rod through spark plug hole and slip adapter over rod.

1936 Valve and Ignition Timing Specifications

Compiled by Weidenhoff Engineers for use with
Weidenhoff Motor Gauge

1936 Passenger Cars	Adapter	Rod	Stroke	Ignition Timing	Before or After T.D.C.	Spark Retard, Advance or Set	Intake Valve Opens	Before or After T.D.C.	Firing Order	Valve Clearances				Breaker Contact Separation	Spark Plug Gap (Ins.)
										Timing		Running			
										Int.	Exh.	Int.	Exh.		
AUBURN 654.....	114	42	4 3/4	.004	B.T.C.	.....	.026	B.T.C.	1-5-3-6-2-4	.012	.012	.010H	.010H	.018	.025
" 852 S. C.....	105	5	4 3/4	.004	B.T.C.	.....	.026	B.T.C.	1-6-2-5-8-3-7-4	.012	.012	.010H	.010H	.018	.025
" 852.....	105	5	4 3/4	.004	B.T.C.	.....	.026	B.T.C.	1-6-2-5-8-3-7-4	.012	.012	.010H	.010H	.018	.025
BUICK 40.....	113	31	3 3/4	.003	B.T.C.	Adv.	.023	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.015H	.015H	.013	.020
" 60.....	113	38	4-5/16	.040	B.T.C.	Adv.	.080	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.015H	.015H	.013	.020
" 80.....	113	31	4-5/16	.040	B.T.C.	Adv.	.080	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.015H	.015H	.013	.020
" 90.....	113	31	4-5/16	.040	B.T.C.	Adv.	.080	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.015H	.015H	.013	.020
CADILLAC V8, 60.....	114	42	4 3/4	.011	B.T.C.	.....	T.D.C.	.....	1R-1L-4R-4L-2L-3R-3L-2R	.000	.000	A	A	.013	.025
" V8, 70, 75.....	114	42	4 3/4	.011	B.T.C.	.....	T.D.C.	.....	1R-1L-4R-4L-2L-3R-3L-2R	.000	.000	A	A	.013	.025
" V12.....	113	33	4	.006	B.T.C.	Adv.	T.D.C.	.....	{ 1L-2R-5L-4R-3L-1R- 6L-5R-2L-3R-4L-6R 1L-4R-5L-7R-2L-3R- 6L-1R-8L-5R-4L- 2R-7L-6R-3L-8R	.000	.000	A	A	.018	.025
" V16.....	113	33	4	.006	B.T.C.	Adv.	T.D.C.	.....	{ 1L-2R-5L-4R-3L-1R- 6L-5R-2L-3R-4L-6R 1L-4R-5L-7R-2L-3R- 6L-1R-8L-5R-4L- 2R-7L-6R-3L-8R	.000	.000	A	A	.014	.025
CHEVROLET Std. 6.....	113*	33	4	.010	B.T.C.	.....	.031	B.T.C.	1-5-3-6-2-4	.006	.013	.006H	.013H	.018	.032
" Mast. 6.....	113*	33	4	.010	B.T.C.	.....	.031	B.T.C.	1-5-3-6-2-4	.006	.013	.006H	.013H	.018	.032
CHRYSLER 6, C-7.....	114-103	42-12	4 3/4	T.D.C.	.....	.....	T.D.C.	.....	1-5-3-6-2-4	.010	.010	.006H	.008H	.020	.025
" DL 8, C-8.....	114-103	42-12	4 3/4	T.D.C.	.....	.....	.002	B.T.C.	1-6-2-5-8-3-7-4	.011	.012	.006H	.008H	.018	.025
" AF 8.....	114-103	42-12	4 3/4	T.D.C.	.....	.....	.002	B.T.C.	1-6-2-5-8-3-7-4	.011	.012	.006H	.008H	.018	.025
" Imp. 8.....	114-103	42-12	4 3/4	.011	A.T.C.	.....	.002	B.T.C.	1-6-2-5-8-3-7-4	.011	.012	.006H	.008H	.018	.025
CORD Series 810.....	.....	3 3/4	.....	.009	B.T.C.	.....	.....	.....	1L-3L-4L-2L-2R-1R-3R-4R	.010	.010	.006H	.008H	.020	.025
DE SOTO AS6.....	114-103	42-12	4 3/4	T.D.C.	.....	.....	T.D.C.	.....	1-5-3-6-2-4	.010	.010	.006H	.008H	.020	.025
" AF 6.....	114-103	42-12	4 3/4	.011	A.T.C.	Adv.	T.D.C.	.....	1-5-3-6-2-4	.010	.010	.006H	.008H	.020	.025
DODGE 6.....	114-103	42-12	4 3/4	.007	A.T.C.	Adv.	.016	A.T.C.	1-5-3-6-2-4	.011	.012	.006H	.008H	.020	.025
DUESENBERG 8.....	104	8	4 3/4	.065	A.T.C.	Adv.	.016	A.T.C.	1-6-2-5-8-3-7-4	.025	.025	.015C	.015C	.018	.025
FORD V8.....	104	40	3 3/4	.006	B.T.C.	.....	.032	B.T.C.	1-5-4-8-6-3-7-2	.013	.013	.013	.013	.015	.025
GRAHAM 6, 80.....	114	2	4	.002	B.T.C.	Adv.	.008	B.T.C.	1-5-3-6-2-4	.012	.010H	.010H	.010H	.018	.025
" 6, 90.....	114	2	4 3/4	.002	B.T.C.	.....	.008	B.T.C.	1-5-3-6-2-4	.012	.010H	.010H	.010H	.018	.025
" 6, 110.....	114	2	4 3/4	.002	B.T.C.	.....	.010	B.T.C.	1-5-3-6-2-4	.012	.012	.010H	.010H	.018	.025
HUDSON 6.....	114	44	5	T.D.C.*	.....	.....	.057	B.T.C.	1-5-3-6-2-4	.010	.010	.006H	.008H	.020	.025
" 8.....	114	44	4 3/4	T.D.C.*	.....	.....	.052	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.006H	.008H	.018	.025
HUPMOBILE 618.....	104	2	4 3/4	.020*	B.T.C.	.....	.003	B.T.C.	1-5-3-6-2-4	.014	.017	.010H	.013H	.018	.028
" 621.....	104	2	4 3/4	.037	B.T.C.	Adv.	.002	A.T.C.	1-4-7-3-8-5-2-6	.010	.017	.006H	.013H	.018	.028
LAFAYETTE 6.....	104	40	4 3/4	.041	B.T.C.	.....	.010	A.T.C.	1-5-3-6-2-4	.015	.015	.015H	.015H	.020	.025
LA SALLE 8.....	114	40	4 3/4	.026	B.T.C.	Adv.	.016	A.T.C.	1-6-2-5-8-3-7-4	.015	.015	.006H	.009H	.013	.025
LINCOLN Zephyr.....	114	40	3 3/4	.006	B.T.C.	.....	.132	B.T.C.	{ 1L-2R-5L-4R-3L-1R- 6L-5R-2L-3R-4L-6R 1L-2R-5L-4R-3L-1R- 6L-5R-2L-3R-4L-6R	.013	.013	.013	.013	.....	.025
" V12.....	113	37	4 3/4	T.D.C.	.....	.....	.185	B.T.C.	{ 1L-2R-5L-4R-3L-1R- 6L-5R-2L-3R-4L-6R 1L-2R-5L-4R-3L-1R- 6L-5R-2L-3R-4L-6R	.003	.005	.003C	.005C	.020	.022
NASH 400-3640A.....	113*	37	4 3/4	T.D.C.	.....	.....	.010	A.T.C.	1-5-3-6-2-4	.015	.015	.015	.015	.020	.025
" Amb. 6.....	113*	37	4 3/4	.089	B.T.C.	.....	.074	A.T.C.	1-5-3-6-2-4	.015	.015	.015H	.015H	.020	.025
" Amb. 8.....	113	31	4 3/4	.090	B.T.C.	.....	.090	A.T.C.	1-6-2-5-8-3-7-4	.015	.015	.015H	.015H	.020	.025
OLDSMOBILE 6.....	104	40	4 3/4	T.D.C.	.....	.....	.010	B.T.C.	1-5-3-6-2-4	.010	.010	.008H	.010H	.018	.030
" 8.....	104	40	4 3/4	.002	B.T.C.	.....	T.D.C.	.....	1-6-2-5-8-3-7-4	.010	.010	.008H	.008H	.013	.030
PACKARD 120.....	114	5	4 3/4	.020	B.T.C.	Adv.	.020	B.T.C.	1-6-2-5-8-3-7-4	.007	.010	.007H	.010H	.018	.028
" 8.....	114	5	5	.017	B.T.C.	Adv.	.410	B.T.C.	1-6-2-5-8-3-7-4	.004	.006	.004H	.006H	.018	.028
" Super 8.....	114	5	5	.017	B.T.C.	Adv.	.410	B.T.C.	1-6-2-5-8-3-7-4	.004	.006	.004H	.006H	.018	.028
" 12.....	114	2	4 3/4	.026	B.T.C.	Adv.	T.D.C.	.....	{ 1R-6L-5R-2L-3R-4L- 6R-1L-2R-5L-4R-3L	.000	.000	A	A	.018	.028
PIERCE-ARROW 8.....	114	29	5	.002	B.T.C.	Adv.	.012	A.T.C.	1-6-2-5-8-3-7-4	.010	.000	A	A	.018	.030
" 1602.....	114	42	4	.009	B.T.C.	Adv.	.135	B.T.C.	{ 1L-2R-5L-4R-3L-1R- 6L-5R-2L-3R-4L-6R 1L-2R-5L-4R-3L-1R- 6L-5R-2L-3R-4L-6R	.004	.006	A	A	.018	.030
" 1606.....	114	42	4	.009	B.T.C.	Adv.	.135	B.T.C.	{ 1L-2R-5L-4R-3L-1R- 6L-5R-2L-3R-4L-6R 1L-2R-5L-4R-3L-1R- 6L-5R-2L-3R-4L-6R	.004	.006	A	A	.018	.030
PLYMOUTH 6.....	114-103	42-12	4 3/4	.007	A.T.C.	.....	.015	A.T.C.	1-5-3-6-2-4	.011	.012	.006H	.008H	.020	.025
PONTIAC Master 6.....	114	42	3 3/4	.018	B.T.C.	.....	.009	B.T.C.	1-5-3-6-2-4	.010	.010	.009H	.009H	.018	.020
" DL 6.....	114	42	3 3/4	.001	B.T.C.	.....	.009	B.T.C.	1-5-3-6-2-4	.010	.010	.009H	.009H	.018	.020
" DL 8.....	114	42	3 3/4	.012	B.T.C.	.....	.008	B.T.C.	1-6-2-5-8-3-7-4	.010	.010	.009H	.009H	.015	.020
REO Flying Cloud 6.....	104	2	4 3/4	.002	B.T.C.	.....	.010	B.T.C.	1-5-3-6-2-4	.012	.012	.007H	.008H	.018	.025
STUDEBAKER Dict. 6.....	104	2	4 3/4	.002	B.T.C.	Adv.	.092	B.T.C.	1-5-3-6-2-4	.020	.020	.026C	.016C	.020	.025
" Pres. 8.....	104	2	4 3/4	T.D.C.	.....	.....	.090	B.T.C.	1-6-2-5-8-3-7-4	.020	.020	.026C	.016C	.020	.025
TERRAPLANE 6.....	114	43	5	T.D.C.	.....	.....	.053	B.T.C.	1-5-3-6-2-4	.010	.010	.006H	.008H	.020	.025
WILLYS 77.....	104	2	4 3/4	.010	A.T.C.	.....	T.D.C.	.....	1-3-4-2	.010	.010	.004H	.006H	.018	.027

EXPLANATION OF ABBREVIATIONS

Adv.—Advanced Spark
A—Automatic Take-up

B.T.C.—Before Top Center
A.T.C.—After Top Center

H—Hot
C—Cold

T.D.C.—Top Dead Center

*Chevrolet Master & Standard—Use No. 113 Adapter with No. 152 Adapter.

*Hudson and Hupmobile cars must be timed from rear cylinder.

*Nash—3640 and Ambassador 6 use No. 113 Adapter with No. 152 Adapter plus No. X4615 Collar.

*Pontiac Six—There are two marks "IGN 1 & 6" on flywheel. The first mark is 6 degrees (.018 inch) before T.D.C. The second mark is 2 degrees (.002 inch) before T.D.C. The recommended setting is by the first mark to compensate for wear.

*Pontiac Eight—There are two marks "IGN 1 & 8" on flywheel. The first mark is 6 degrees (.012 inch) before T.D.C. The second mark is 2 degrees (.002 inch) before T.D.C. The recommended setting is by the first mark to compensate for wear.

Note—On Cars using 14 mm. spark plugs, first insert rod through spark plug hole and slip adapter over rod.

1936 Supplement

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AUBURN							
1389		1936	6-54 6 cyl.	654-6500 and up	Auto-Lite MAJ-4032	Auto-Lite GAR-4603-b	Auto-Lite IGB-4318
1390		1936	6-54 6 cyl. With Startix	654-6500 and up	Auto-Lite MAJ-4033-3	Auto-Lite GAR-4603-b	Auto-Lite IGB-4318
1391		1936	8-52 Straight Eight	852-4500 and up	Auto-Lite MAB-4063	Auto-Lite GAR-4603-b	Auto-Lite IGP-4002
1392		1936	8-52 "Super-Charged" Straight Eight	852-34500 and up	Auto-Lite MAB-4063	Auto-Lite GAR-4603-A-5	Auto-Lite IGH-4027
BUICK							
1393		1936	Series 36-40 Special Straight Eight (Early)	2830899 and up Motor No. 42995240 and up	Delco-Remy 734-Z	Delco-Remy 936-C	Delco-Remy 663-F
1394		1936	Series 36-40 Special Straight Eight (Late)		Delco-Remy 734-Z	Delco-Remy 936-C	Delco-Remy 663-F
1395		1936	Series 36-60 and 80 Century Straight Eights (Early)	2830899 and up Motor No. 83001000 and up	Delco-Remy 727-W	Delco-Remy 936-P	Delco-Remy 663-E
1396		1936	Series 36-60 and 80 Roadmaster Straight Eights (Late)		Delco-Remy 727-W	Delco-Remy 936-P	Delco-Remy 663-E
1397		1936	Series 36-90 Limited Straight Eight (Early)	2830899 and up Motor No. 9300100 and up	Delco-Remy 727-W	Delco-Remy 936-P	Delco-Remy 663-E
1398		1936	Series 36-90 Limited Straight Eight (Late)		Delco-Remy 727-W	Delco-Remy 936-P	Delco-Remy 663-E
CADILLAC							
1399		1936	36-60, 36-70 36-75, "Vee" Eights	(36-60) 60100001 and up (36-70 & 75) 3110001 and up	Delco-Remy 727-V	Delco-Remy 961-E	Delco-Remy 663-G
1400		1936	36-80, 36-85 "Vee" Twelves	4,110,001 and up	Delco-Remy 580	Delco-Remy 933-M	Delco-Remy 667-C
1401		1936	36-90 "Vee" 16	5,110,001 and up	Delco-Remy 580	Delco-Remy 933-M	Delco-Remy 4118
CHEVROLET							
1402		1936	"Master" Series FA, 6 cyl.	FA-1001 and up	Delco-Remy 738-G	Delco-Remy 935-V	Delco-Remy 645-T
1403		1936	"Standard" Series FC, 6 cyl.	FC-1001 and up	Delco-Remy 738-G	Delco-Remy 946-C	Delco-Remy 645-T
CHRYSLER							
1404		1936	"Airstream", C-7 6 cyl.	6823301 and up	Auto-Lite MAX-4016	Auto-Lite GAR-4608-A-5	Auto-Lite IGS-4006-1, IGS-4006-A-1
1405		1936	C-8, "Airstream" Straight Eight	6710501 and up	Auto-Lite MAX-4020	Auto-Lite GAR-4608-A-5	Auto-Lite IGT-4001-1, IGT-4001-D-1
1406		1936	C-9, "Airflow" Straight Eight	6606201 and up	Auto-Lite MAX-4003	Auto-Lite GAR-4608-B 5	Auto-Lite IGT-4001-C-1 IGT-4001-E-1
1407		1936	C-10, C-11 "Imperial Airflow" Straight Eights	7014901 and up 7803851 and up	Auto-Lite MAX-4003	Auto-Lite GAR-4608-B-5	Auto-Lite IGT-4001-C-1 IGT-4001-E-1
CORD							
1408		1936	Series 810	810-1001 and up	Auto-Lite MAX-4021	Auto-Lite GAR-4630-b, GBR-4603-b	Auto-Lite IGP-4006
DE SOTO							
1409		1936	S-1, "Airstream" 6 cyl.	(Standard) 6043701 and up (Custom) 5500001 and up	Auto-Lite MAX-4015	Auto-Lite GAR-4608-A-5	Auto-Lite IGS-4006-1, IGS-4006-A-1
1410		1936	S-2, "Airflow" 6 cyl.	5089001 and up	Auto-Lite MAX-4016	Auto-Lite GAR-4608-A-5	Auto-Lite IGS-4006-1, IGS-4006-A-1
DODGE							
1411		1936	D-2 6 cyl.	4015051 and up	Auto-Lite MAW-4010	Auto-Lite GAR-4608-5	Auto-Lite IGS-4002-1, IGS-4002-A-1
DUSENBERG							
1412		1936	J and SJ		Delco-Remy 429	Delco-Remy 428	Delco-Remy 4094
FORD							
1413		1936	68 "Vee" 8	18-2207111 and up	Ford 18-11002	Ford 40-10000-B	Ford 40-12127-B
GRAHAM							
1414		1936	80, "Crusader" 6 cyl.	300001 and up	Delco-Remy 738-J, 738-V	Delco-Remy 937-Y	Delco-Remy 623-A
1415		1936	90, "Cavalier" 6 cyl.	200001 and up	Delco-Remy 738-T	Delco-Remy 948-B	Delco-Remy 623-A
1416		1936	110, "Supercharger" 6 cyl.	100001 and up	Delco-Remy 738-T	Delco-Remy 948-B	Delco-Remy 623-E

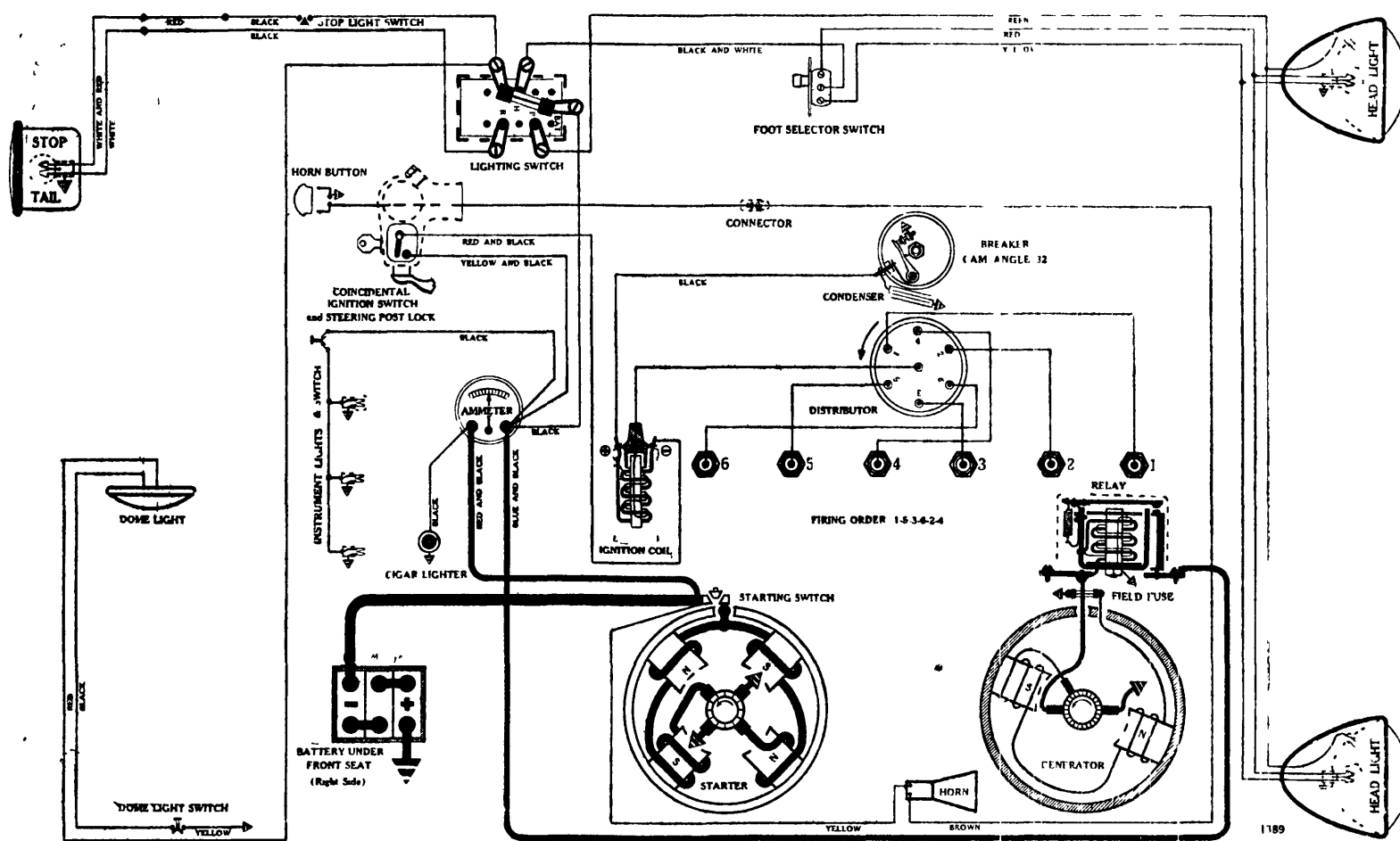
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1417	HUDSON	1936	63 6 cyl.	63101 and up	Auto-Lite MAB-4075	Auto-Lite GAR-4701-6	Auto-Lite IGB-4301-B
1418		1936	64, 65, 66, 67 Straight Eights	64101 and up	Auto-Lite MAB-4075	Auto-Lite GAR-4701-6	Auto-Lite IGP-4001-B
1419	HUPMOBILE	1936	G, Series 618 6 cyl.	G-5001 and up	Auto-Lite MAJ-4044	Auto-Lite GBK-4604	Auto-Lite IGB-4319
1420		1936	N, Series 621 Straight Eight	N-5001 and up	Auto-Lite MAB-4081	Auto-Lite GAR-4620-5	Auto-Lite IGP-4003
1421	LAFAYETTE	1936	3610 6 cyl.	L-23101 and up	Auto-Lite MAB-4076	Auto-Lite GAR-4601-5	Auto-Lite IGB-4317-A, IGB-4317-B
1422	LA SALLE	1936	36-50 Straight Eight	2210001 and up	Delco-Remy 727-N	Delco-Remy 961-D	Delco-Remy 663-J
1423	LINCOLN	1936	K Series "Vee" 12	K-5501 and up	Auto-Lite MAO-4003-B	Auto-Lite GBC-4103	Auto-Lite IGM-4003, IGM-4003-A
1424	LINCOLN-ZEPHYR	1936	902 "Vee" 12	H-1 and up	Zephyr 18-11002	Zephyr 68-10000	Zephyr H-12000
1425	NASH	1936	3620, Ambassador Twin Ign. Six	R-30331 and up	Auto-Lite MAB-4077	Auto-Lite GAR-4601-5 GBR-4602-4	Auto-Lite IGE-4012-A, IGE-4012-B
1426		1936	3640, 3640-A, Series 400, 6 cyl.	C-1001 to C-9500 C-9501 and up	Auto-Lite MAB-4076	Auto-Lite GAR-4618-2	Auto-Lite IGB-4328-A, IGB-4328-B
1427		1936	3680, Ambassador Twin Ign. Eight	B-77325 and up	Auto-Lite MAB-4054	Auto-Lite GBR-4602-4	Auto-Lite IGK-4101
1428	OLDSMOBILE	1936	F-36 6 cyl.	200001 and up	Delco-Remy 738-S	Delco-Remy 936-T	Delco-Remy 647-C
1429		1936	L-36 Straight Eight	100001 and up	Delco-Remy 727-Z	Delco-Remy 936-T	Delco-Remy 663-K
1430	PACKARD	1936	One Twenty-B Straight Eight		Auto-Lite MAX-4006	Auto-Lite GAR-4611-A-5, GBR-4601-5	Auto-Lite IGH-4026-A
1431		1936	1400, 1401, 1402 Straight Eights		Auto-Lite MAX-4014	Owen-Dyneto CO-1300	Delco-Remy 662-T
1432		1936	1403, 1404, 1405 Straight Eights		Owen-Dyneto DN-1298	Owen-Dyneto CO-1300	Delco-Remy 662-T
1433		1936	1407 and 1408 "Vee" Twelves		Owen-Dyneto DN-1299	Owen-Dyneto CO-1304	Auto-Lite IGO-4002-A
1434	PIERCE-ARROW	1936	1601 Straight Eight	2215001 and up	Owen-Dyneto DI-1314	Owen-Dyneto CO-1309	Delco-Remy 662-J
1435		1936	1602 and 1603 "Vee" Twelves	3130001 and up 3150001 and up	Owen-Dyneto DI-1313	Owen-Dyneto CO-1309	Delco-Remy 4105
1436	PLYMOUTH	1936	P-1 Business 6 cyl.	(Detroit) 1111701 and up	Auto-Lite MAW-4009	Auto-Lite GBM-4603-B-1	Auto-Lite IGS-4003-1, IGS-4003-A-1 IGS-4003-B-1
1437		1936	P-2 DeLuxe 6 cyl.	(Detroit) 2641401 and up	Auto-Lite MAW-4009	Auto-Lite GAR-4608-E-5	Auto-Lite IGS-4003-1, IGS-4003-A-1 IGS-4003-B-1
1438	PONTIAC	1936	36-26 6 cyl.	62601001 and up	Delco-Remy 727-Y	Delco-Remy 935-W	Delco-Remy 647-B
1439		1936	36-28 8 cyl.	62891001 and up	Delco-Remy 727-S	Delco-Remy 935-W	Delco-Remy 663-H
1440	REO	1936	6-D, Flying Cloud 6 cyl.	6D-101 and up	Delco-Remy 738-K	Delco-Remy 937-Z	Delco-Remy 623-D
1441	STUDEBAKER	1936	3-A, Dictator 6 cyl.	(So. Bend) 5512001 and up (Calif.) 5850001 and up	Auto-Lite MAX-4019	Auto-Lite GBM-4604-A-2	Auto-Lite IGW-4001
1442		1936	4-A, Dictator 6 cyl.	(So. Bend) 5235001 and up (Calif.) 5800001 and up	Auto-Lite MAX-4018	Auto-Lite GAR-4609-A-4	Auto-Lite IGW-4001
1443		1936	2-C, President Straight Eight	(So. Bend) 7104001 and up (Calif.) 7800001 and up	Delco-Remy 737-J	Delco-Remy 936-X	Delco-Remy 662-M
1444	TERRAPLANE	1936	61 6 cyl.	61101 and up	Auto-Lite MAB-4075	Auto-Lite GAR-4702	Auto-Lite IGB-4301-B
1445		1936	62 6 cyl.	62101 and up	Auto-Lite MAB-4075	Auto-Lite GAR-4701-6	Auto-Lite IGB-4301-B
1446	WILLYS	1936	77 4 cyl.		Auto-Lite MZ-4033	Auto-Lite GAM-4504	Auto-Lite IGS-4007

AUBURN

Engine { Bore 3-1/16
Strok 4-3/4

Model 6-54, 6 cyl., (1936)



BATTERY

U.S.L., RN-15-A, 6 volts. Positive Terminal Grounded
 Starting Capacity—115 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—2.9.
 Lighting Capacity—4.5 amps. for 20 hours (90 amp. hour).
 Box—Length—8 7/8; width, 7; height, 8 1/2 inches.

STARTER

A-L Test CU-277 Rotation, L. H., Com. End
 Auto-Lite, MAJ-4032

Connection to Engine—Bendix Drive, Type R11FX-10.
 Running Free—67 amps. at 5 1/2 volts, 4100 R.P.M.
 Cranking Engine—140 amps. at 5.4 volts.
 Engine Cranking Speed—144 R.P.M.
 Stall Data (on Car)—420 amps. at 3.8 volts.
 Lock Torque (for Test Bench use)—12 pound-feet, 550 amps. at 3 volts.
 Brush Spring Tension—44 to 56 oz. on each (new brushes).
 Starting Switch—Auto-Lite, SW-3737-S (on starter).
 Armature—Auto-Lite, MAJ-2006.

IGNITION

A-L Test 396 Rotation, L. H., Top View
 Auto-Lite, IGB-4318

Breaker—Contact separation .020 inch.
 Cam Angles—Points closed 32 degrees; open 28 degrees (by actual tests).
 Cam Angles—Points closed 34 degrees; open 26 degrees (official A-L data).
 Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark (located 3 degrees or approximately one tooth ahead of mark "UDC 1-6") registers with indicator line at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
 Spark Plugs—14-MM (Champion type J-6); Gap .025 inch.
 Firing Order—1-5-3-6-2-4.
 Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
1320	660	3
1800	900	5
2280	1140	7
3000 (Max.)	1500	10

Ignition Coil—Auto-Lite, IG-4065.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 800999.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4603-5 (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.2	10	1150	7.1
2	850	6.3	14	1400	7.6
4	900	6.5	16	1600	7.8
6	950	6.7	18	1800 (Max.)	8.
8	1050	7.			

Motoring Freely—5.2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5 1/2 volts.

Field Test—4.1 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps. (Type 1A-7 1/2).

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2077.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

Closes—6 3/4 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. A-5640-A.

Location—Behind instrument board, operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.

Spare fuse in clip on switch support.

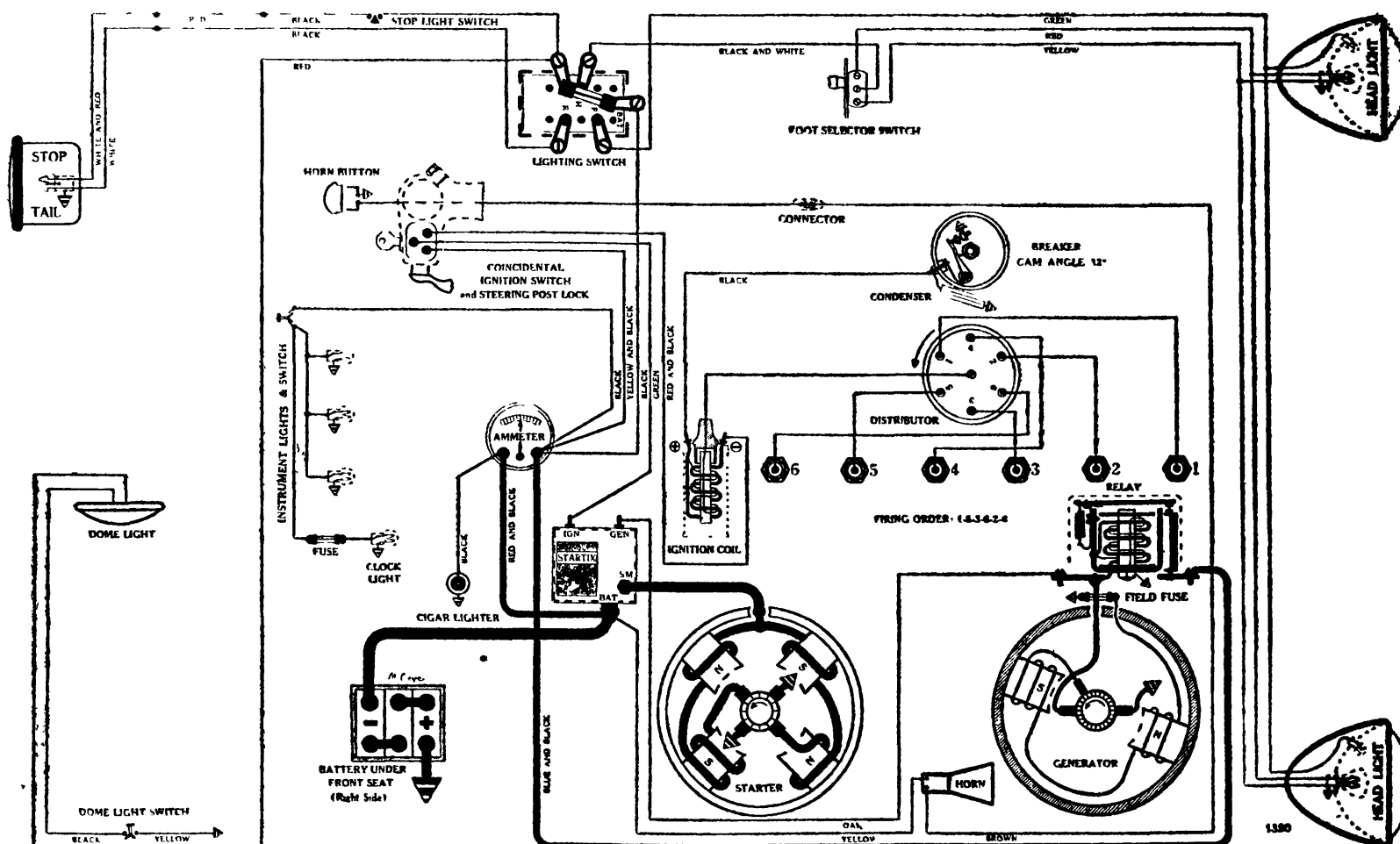
Foot Selector Switch—Delco-Remy, 465-W.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

AUBURN

Engine { Bore 3-1/16
Str k 4-3/4

Model 6-54, 6 cyl., with Startix, (1936)



BATTERY

U.S.L., RN-15 A, 6 volts. Positive Terminal Grounded

Starting Capacity—115 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F. 2.9.

Lighting Capacity—4.5 amps. for 20 hours (90 amp. hour).

Box—Length—8 7/8; width, 7; height, 8 3/4 inches.

STARTER

A-L Test CU-277 Rotation, L. H., Com. End

Auto-Lite, MAJ-4033-3

Connection to Engine—Bendix Drive, Type R11FX-10.

Running Free—67 amps. at 5 1/2 volts, 4100 R.P.M.

Cranking Engine—140 amps. at 5.4 volts.

Engine Cranking Speed—144 R.P.M.

Stall Data (on Car)—420 amps. at 3.8 volts.

Lock Torque (for Test Bench use)—12 pound-feet, 550 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (new brushes).

Starting Switch—"Startix", type D, Automatic Starting Switch and Anti Stall Device.

Armature—Auto-Lite, MAJ-2006.

IGNITION

A-L Test 396

Rotation, L. H., Top View

Auto-Lite, IGB-4318

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 32 degrees; open 28 degrees (by actual tests).

Cam Angles—Points closed 34 degrees; open 26 degrees (official A-L data).

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark (located 3 degrees or approximately one tooth ahead of mark "UDC 1.6") registers with indicator line at flywheel inspection hole. With key under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (Champion type J-6); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
600	300		3
1320	660		5
1800	900		7
2280	1140		10
3000 (Max.)	1500		

Ignition Coil—Auto-Lite, IG-4065.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301000.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4603-5 (Belt Drive, Air Cooled)

Performance Data Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.2	10	1150	7.1
2	850	6.3	14	1400	7.6
4	900	6.5	16	1600	7.8
6	950	6.7	18	1800 (Max.)	8.
8	1050	7.			

Motoring Freely—5.2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5 1/2 volts.

Field Test—4.1 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps. (Type 1A-7 1/2).

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2077.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

Closes—6 3/4 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Soteng-Manegold, No. A-5640-A.

Location—Behind instrument board, operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.

Spare fuse in clip on switch support.

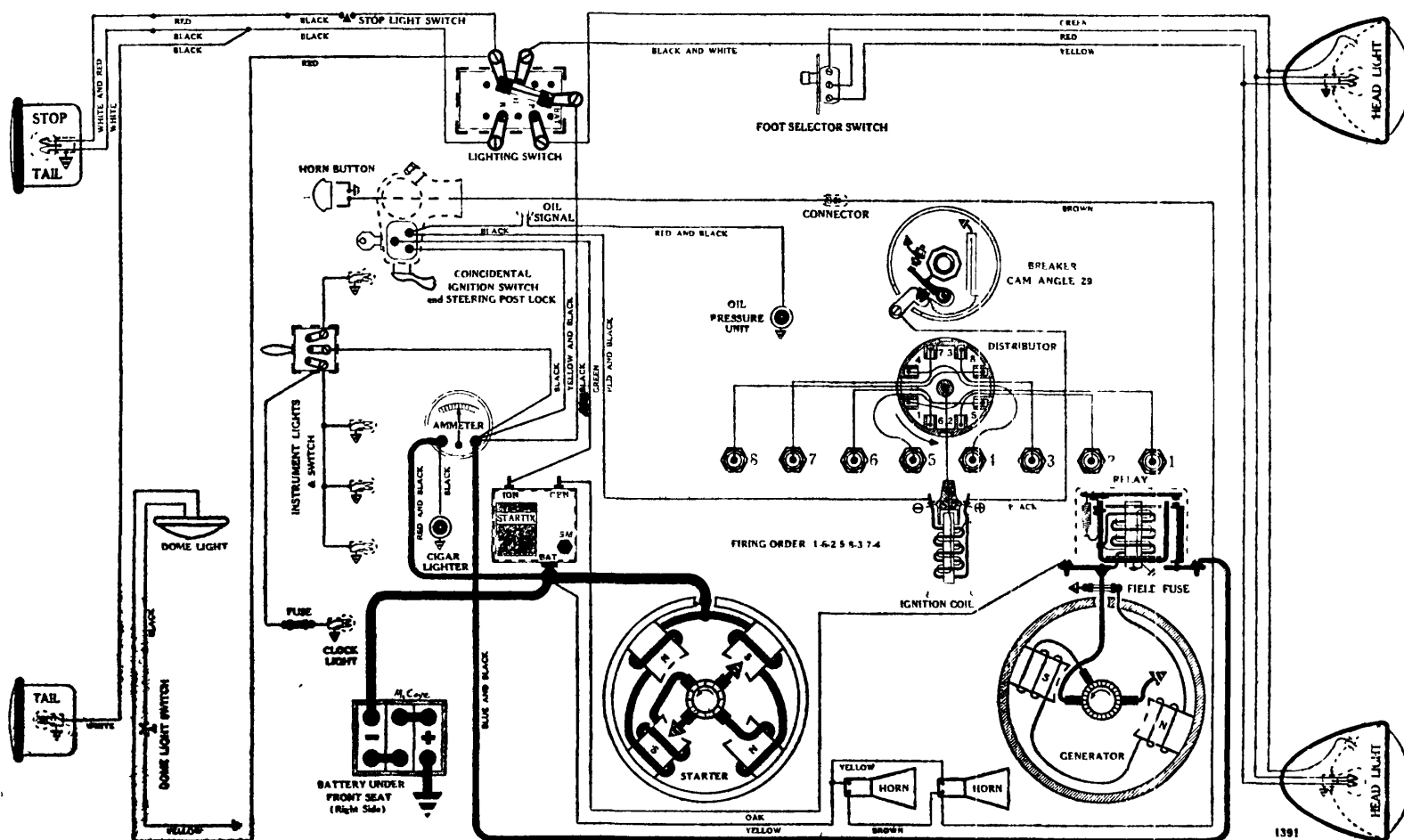
Foot Selector Switch—Delco-Remy, 465-W.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

AUBURN

Engine { Bore 3-1/16
Strok 4-3/4

Mod 1 8-52, Straight Eight, (1936)

**BATTERY**

U.S.L., XY-15-A, 6 volts. Positive Terminal Grounded
Starting Capacity—122 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.3.
Lighting Capacity—5.2 amps. for 20 hours (105 amp. hour).
Box—Length, 10 1/4; width, 7; height, 8 5/8 inches.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End

Auto-Lite, MAB-4063

Connection to Engine—Bendix Drive, Type R11FX-10.

Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.

Cranking Engine—125 amps. at 5.1 volts.

Engine Cranking Speed—108 R.P.M.

Stall Data (on Car)—320 amps. at 4 volts.

Lock Torque (for Test Bench use)—15 1/2 pound-feet, 582 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (new brushes).

Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.

Armature—Auto-Lite, MAB-2006.

IGNITION

A-L Test 396 Rotation, L. H., Top View

Auto-Lite, IGP-4002

(Full Automatic Spark Advance)

Breaker—Contact separation—.017 inch.

Cam Angles—Points closed 29 degrees; open 16 degrees (by actual test).

Cam Angles—Points closed 27 1/2 degrees; open 17 1/2 degrees (official A-L data).

Contact Spring Tension—18 to 20 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark (located 3 degrees or approximately one tooth ahead of mark "UDC 1-8") registers with indicator line at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (Champion type J-6); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
1320	660	3
1800	900	5
2280	1140	7
3000 (Max.)	1500	10

Ignition Coil—Auto-Lite, CE-4001-G.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301000.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4603-5 (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps	R.P.M.	Volts
0	750	6.2	10	1150	7.1
2	850	6.3	14	1400	7.6
4	900	6.5	16	1600	7.8
6	950	6.7	18	1800 (Max.)	8.
8	1050	7.			

Motoring Freely—5.2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5 1/2 volts.

Field Test—4.1 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps. (Type 1A-7 1/2).

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2077.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

Closes—6 1/4 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. A-5640-A.

Location—Behind instrument board, operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.

Spare fuse in clip on switch support.

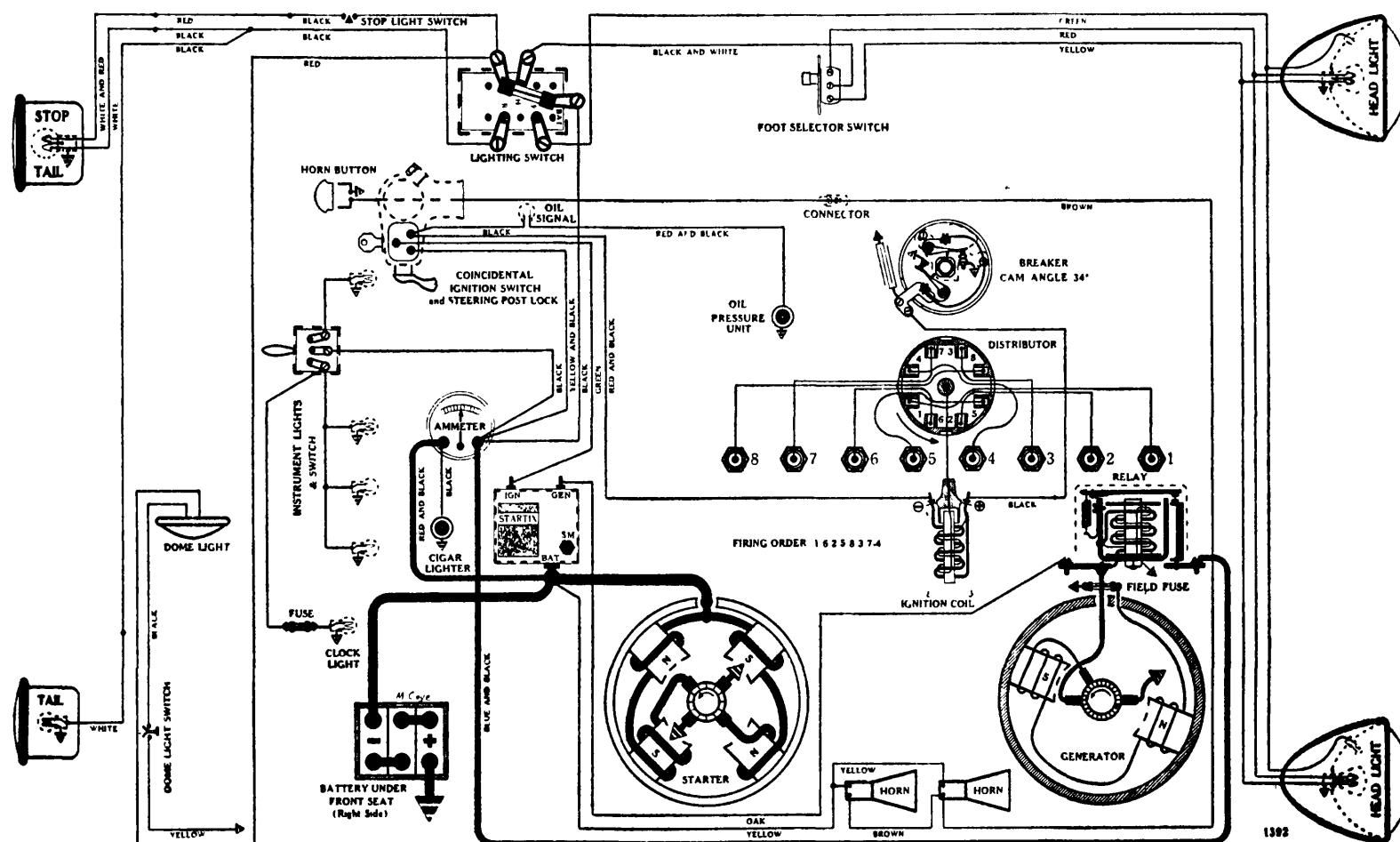
Foot Selector Switch—Delco-Remy, 465-W.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2820; PARK—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158 (left fender); TAIL—63 (right fender).

AUBURN

 Engin { Bore 3-1/16
 } Strok 4-3/4

Model 8-52, "Sup r-Charg d" Straight Eight, (1936)



BATTERY

U.S.L., XY-15-A, 6 volts. Positive Terminal Grounded
 Starting Capacity—122 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—3.3.
 Lighting Capacity—5.2 amps. for 20 hours (105 amp. hour).
 Box—Length, 10 1/4; width, 7; height, 8 5/8 inches.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End
 Auto-Lite, MAB-1063
 Data same as Auburn, Straight Eight, (1936).

IGNITION

A-L Test 434 Rotation, L. H., Top View
 Auto-Lite, IGH-4027
 (Full Automatic Spark Advance)

Breakers—Contact separation .020 inch.
 Cam Angles—Points closed 34 degrees; open 56 degrees (each breaker separately). Primary circuit closed 34 degrees; open 11 degrees (with both breakers operating); (by actual tests).
 Cam Angles—Points closed 32 degrees; open 58 degrees (each breaker separately). Primary circuit closed 32 degrees; open 13 degrees (with both breakers operating); (official A-L data).
 Contact Spring Tension—17 to 19 oz. on each.
 Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.
 Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark (located 3 degrees or approximately one tooth ahead of mark "UDC 18") registers with indicator line at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—14-MM (Champion type J-9); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—5 1/2 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
800	400		2
1950	975		3
2530	1265		5
3690	1845		5 1/2
4000 (Max.)	2000		

Ignition Coil—Auto-Lite, CE-4001.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301000.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4603-A-5 (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.2	10	1150	7.1
2	850	6.3	14	1400	7.6
4	900	6.5	16	1600	7.8
6	950	6.7	18	1800 (Max.)	8.
8	1050	7.			

Motoring Freely—5.2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5 1/2 volts.

Field Test—4.1 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps. (Type 1A-7 1/2).

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2077.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

Closes—6 3/4 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. A-5640-A.

Location—Behind instrument board, operated by pull knob.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch.

Clock fuse, 6 amp. (type 1A-6) on clock.

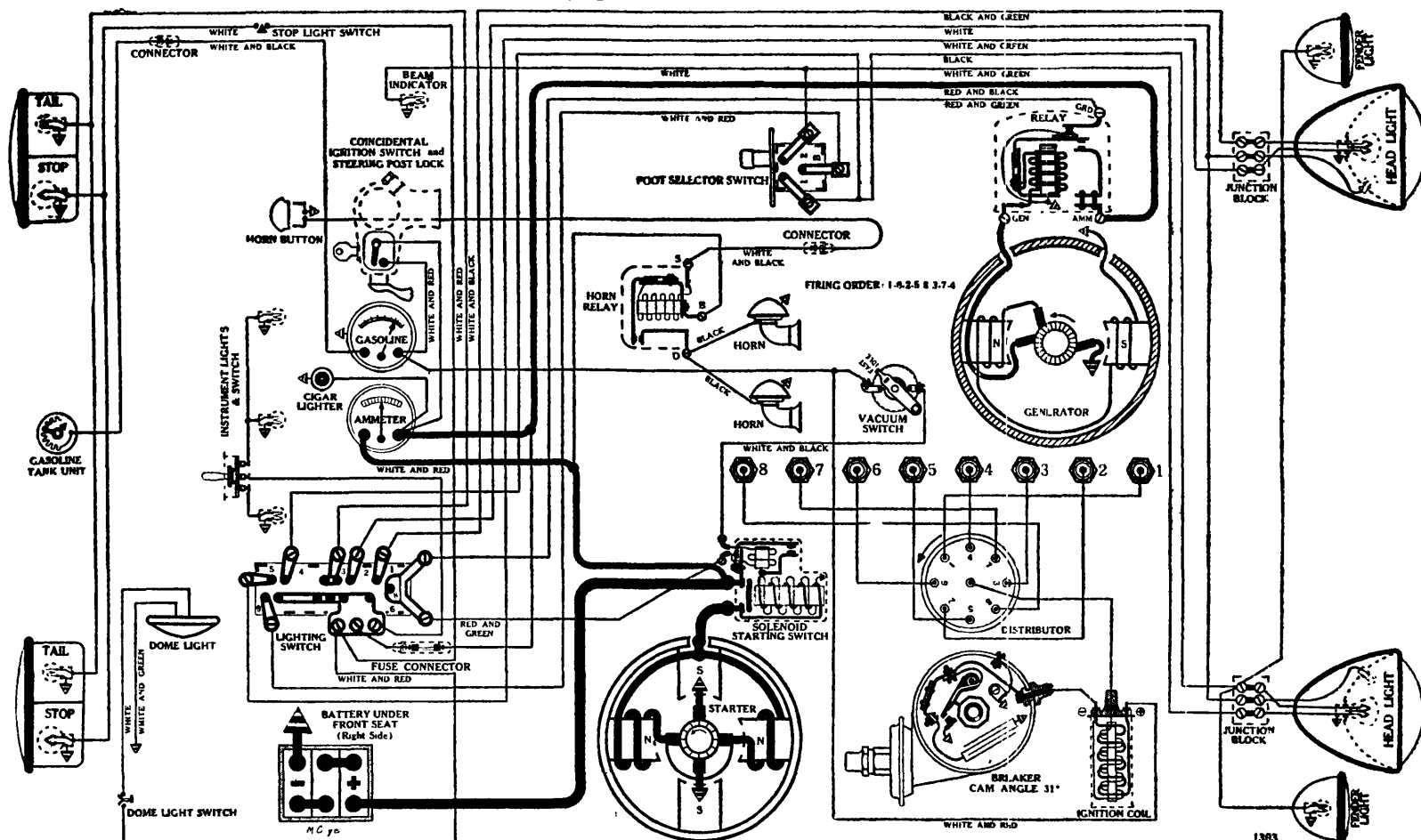
Foot Selector Switch—Delco-Remy, 465-W.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—63; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158 (left fender); TAIL—63 (right fender).

BUICK

S ries 36-40, Sp cial Straight Eight, (Early 1936)

Engin {B re 3-3/32
Strok 3-7/8



BATTERY

Delco-Remy, 13-J, 6 volts. Negative Terminal Grounded

Starting Capacity—117 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.

Lighting Capacity—4.9 amps. for 20 hours (98 amp. hour).

Box—Length, 9-1/16; width, 7; height, 9 1/4 inches.

STARTER

D-R Test 402

Rotation, L. H., Com. End

Group 38

Delco-Remy, 734-Z

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch, remote control relay (located in solenoid unit), and an auxiliary set of grounding points found on cut-out relay.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—120 amps. at 5 volts.

Engine Cranking Speed—84 R.P.M.

Stall Data (on Car)—350 amps. at 3.5 volts.

Lock Torque (for test bench use)—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1512.

Vacuum Starting Control Switch—Delco-Remy, 1594. Test data same as for 1601 unit found on page 1395).

Armature—Delco-Remy, 823881.

IGNITION

D-R Test 106

Rotation, L. H., Top View

Group 63

Delco-Remy, 663-F

(Full Automatic Spark Advance in conjunction with Delco-Remy, 680-R Vacuum Advance Unit, which controls position of Breaker Plate)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "ADV" (cut in flywheel and filled with white paint; located slightly less than 1/4 inch ahead of "upper dead center mark") registers with line at the flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Octane Selector—Observe position of reference pointer index line. This line should be at "O" on scale after above timing procedure. If it is not, loosen pointer locking screw using a 3/16 inch Allen set screw wrench, and bring pointer to correct position. Relock the set screw.

Spark Plugs—18-MM (AC type H-9); Gap .020 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance Unit (Delco-Remy 680-R; test No. 665)—5 to 6 1/2 degrees (Dist. advance). Starts with vacuum of from 5 to 7 inches mercury. Requires vacuum of from 10 to 13 inches for full travel.

Automatic Advance—13 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400	200	Start
580	290	3
800 (Intermediate)	400	7
1450	725	10
2100 (Max.)	1050	13

Ignition Coil—Delco-Remy, 536-H.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301250.

GENERATOR

D-R Test 1243

Rotation, L. H., Com. End

Group 24

Delco-Remy, 936-C, (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.5	12	1200	7.5
4	800	6.8	18	1800	8.
8	960	7.1	20	2400 (Max.)	8.2

Motoring Freely—3 1/2 amps. at 6 volts.

Max. Stall Current—25 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAYS

Cut-Out Relay, Delco-Remy 270-B or 5589 Regulator

For Data see page 1394, (Late 1936).

LIGHTING

Switch—Delco-Remy, 479-M (cars with parking bulbs in head lights).

Location—Behind instrument board.

Fuses—Single 30 amp. fuse (type 3A-30) in fuse connector found on wire connecting ammeter to No. 6 terminal on lighting switch.

Dash Light Switch—Delco-Remy, 1404.

Horn Relay—Delco-Remy, 268-W.

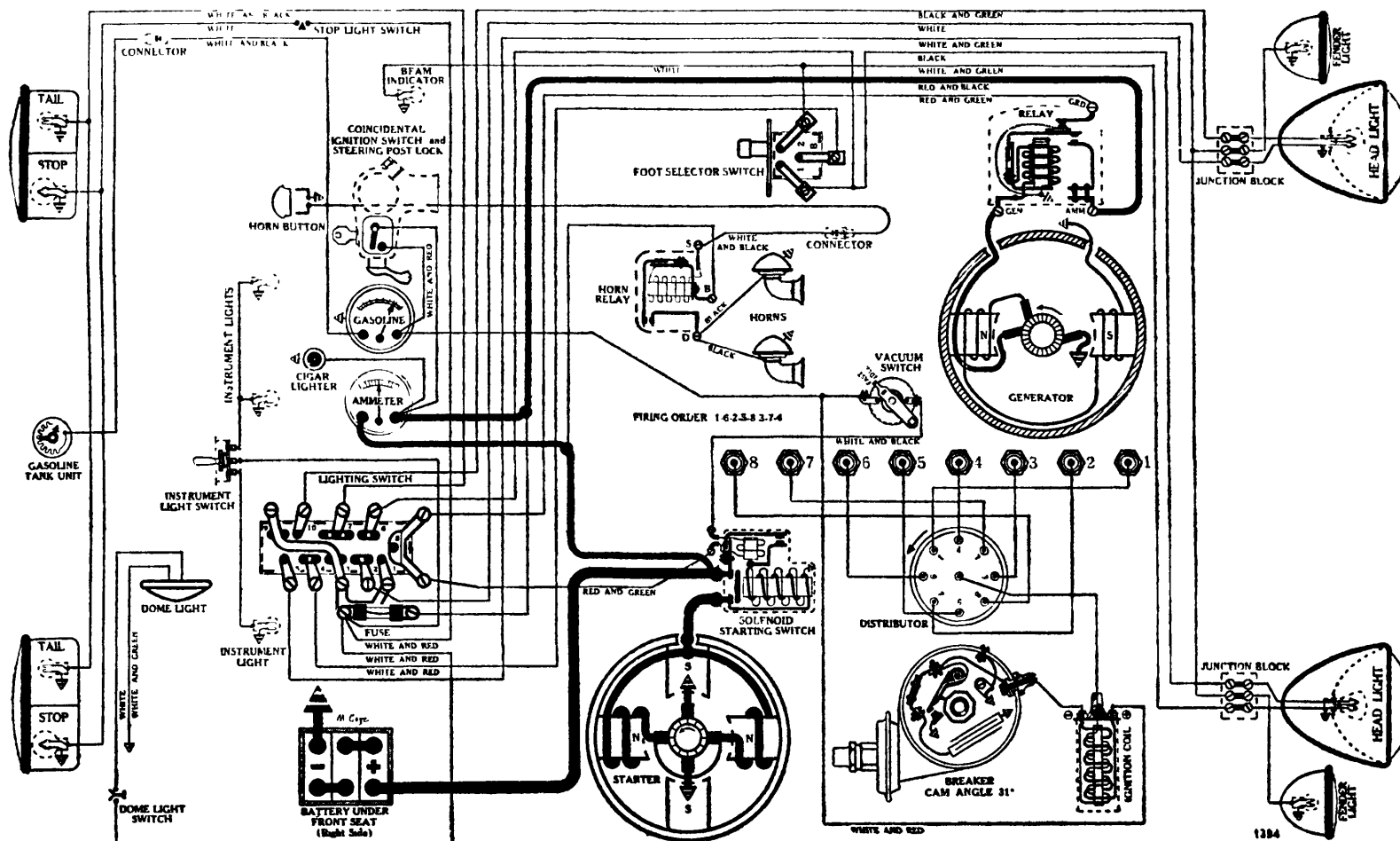
Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; FENDER—55; MAP LIGHT—55; BEAM INDICATOR—51; INSTRUMENT—51; DOME—81; STOP—87; TAIL—63.

BUICK

S ries 36-40, Special Straight Eight, (Lat 1936)

Engin { B r 3-3/32
Strok 3-7/8



BATTERY

Delco-Remy, 13-J, 6 volts. Negative Terminal Grounded

Starting Capacity—117 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.

Lighting Capacity—4.9 amps. for 20 hours (98 amp. hour).

Box—Length, 9-1/16; width, 7; height, 9 1/8 inches.

STARTER

D-R Test 102 Rotation, L. H., Com. End Group 38

Delco-Remy, 734-Z

For Data see page 1393, (Early 1936).

IGNITION

D-R Test 106 Rotation, L. H., Top View Group 63

Delco-Remy, 663-F

(Full Automatic Spark Advance in conjunction with Delco-Remy, 680-R Vacuum Advance Unit, which controls position of Breaker Plate)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "ADV" (cut in flywheel and filled with white paint; located slightly less than 1/4 inch ahead of "upper dead center mark") registers with line at the flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Octane Selector—Observe position of reference pointer index line. This line should be at "O" on scale after above timing procedure. If it is not, loosen pointer locking screw using a 3/16 inch Allen set screw wrench, and bring pointer to correct position. Relock the set screw.

Spark Plugs—18-MM (AC type H-9); Gap .020 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance Unit (Delco-Remy 680-R; test No. 665) 5 to 6 1/2 degrees (Dist. advance). Starts with vacuum of from 5 to 7 inches mercury. Requires vacuum of from 10 to 13 inches for full travel.

Automatic Advance 13 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
100	200		3
580	290		7
800 (Intermediate)	400		10
1450	725		13
2100 (Max.)	1050		

Ignition Coil—Delco-Remy, 536-H.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301250.

GENERATOR

D-R Test 1213

Rotation, L. H., Com. End

Group 24

Delco-Remy, 936-C, (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.5	12	1200	7.5
4	800	6.8	18	1800	8.
8	960	7.1	20	2400 (Max.)	8.2

Motoring Freely—3 1/2 amps. at 6 volts.

Max. Stall Current—25 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole, move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAYS

Optional Equipment, Delco-Remy 5589 Voltage Operated Two-Stage Regulator. For details of operation and instructions for adjusting see Technical Section.

Cut-Out Relay, Delco-Remy 270-B

Closes—6.7 to 7.5 volts.

Opens—0 to 3.5 amps. discharge.

Contact Gap—.018 to .025 inch.

Core Gap—.018 to .022 inch. contacts closed.

Spring Tension—6.2 oz. (minimum) to open upper contacts.

LIGHTING

Switch—Delco-Remy, 479-F (with Delco-Remy 1863581 Fuse Block which is attached to terminals Nos. 1 and 3 on switch back).

Location—Behind instrument board.

Fuses—Single 30 amp. fuse (type 3A-30) in fuse block on switch back.

Dash Light Switch—Delco-Remy, 1404.

Horn Relay—Delco-Remy, 268-W.

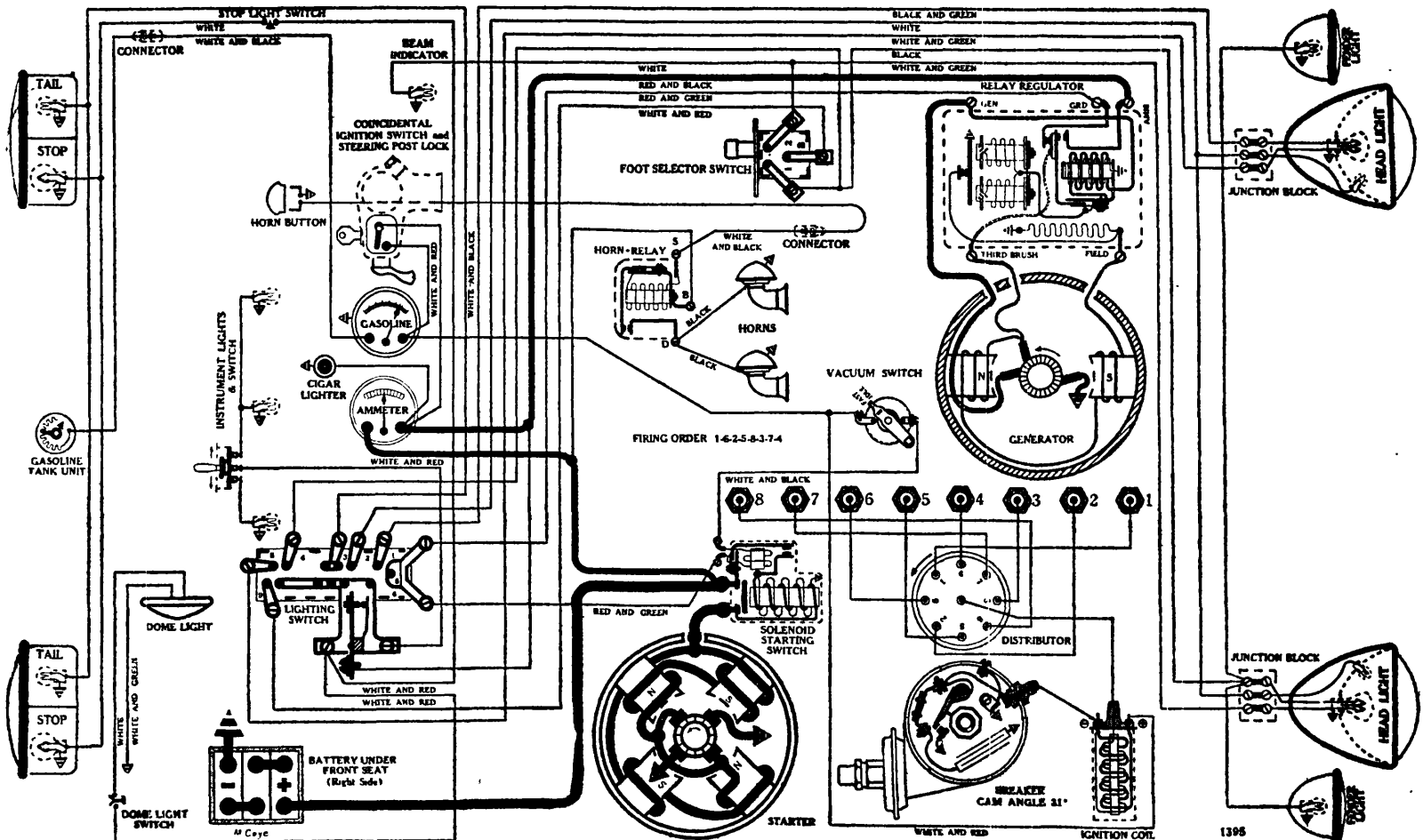
Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; FENDER—55; MAP LIGHT—55; BEAM INDICATOR—51; INSTRUMENT—51; DOME—81; STOP—87; TAIL—63.

BUICK

Series 36-60 and 80, Century Straight Eights, (Early 1936)

Engine (Bor 3-7/16
Str k 4-5/16)



BATTERY

Delco-Remy, 15-G, 6 volts. Negative Terminal Grounded

Starting Capacity—137 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—4.

Lighting Capacity—5.7 amps. for 20 hours (114 amp. hour).

Box—Length, 10-9/32; width, 7; height, 9 1/4 inches.

STARTER

D-R Test 396

Rotation, L. H., Com. End

Group 47

Delco-Remy, 727-W

Connection to Engine—Mechanical pinion shift incorporating an overrunning clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch, remote control relay (located in the solenoid unit), an auxiliary set of insulated points found on the cut-out relay armature, and the third brush lead wire found on the generator.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—160 amps. at 4.9 volts.

Engine Cranking Speed—96 R.P.M.

Stall Data (on Car)—380 amps. at 3 volts.

Lock Torque (for test bench use)—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1512.

Vacuum Starting Control Switch—Delco-Remy, 1601. Contacts should close when turned thru 10 to 12 degrees L. H. from latch position. Requires a vacuum of from 3.4 to 4.6 inches of mercury to unlatch vacuum switch from approximately a 30 degree latch position.

Armature—Delco-Remy, 820158.

IGNITION

D-R Test 1000

Rotation, L. H., Top View

Group 63

Delco-Remy, 663-E

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-R Vacuum Advance Unit, which controls position of Breaker Plate.)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "ADV" (cut in flywheel and filled with white paint) registers with line at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Octane Selector—Observe position of reference pointer index line. This line should be at "O" on scale after above timing procedure. If it is not, loosen pointer locking screw using a 3/16 inch Allen set screw wrench, and bring pointer to correct position. Retighten the set screw.

Spark Plugs—18-MM (AC type H-9); Gap .020 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance Unit (Delco-Remy 680-R; test No. 665)—5 to 6 1/2 degrees (Dist. advance). Starts with vacuum of from 5 to 7 inches mercury. Requires vacuum of from 10 to 13 inches for full travel.

Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.

Dist. R.P.M.

Degrees Advance (Dist.)

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400	200	Start
570	285	3
690	345	5
800 (Intermediate)	400	7
1250	625	9
1700	850	11
2600 (Max.)	1300	15

Ignition Coil—Delco-Remy, 536-H.

Ignition Switch—Oakes Steering Post and Ignition Lock. Model 36-60, No. 301250; Model 36-80, No. 301255.

GENERATOR

D-R Test 1250

Rotation, L. H., Com. End

Group 24

Delco-Remy, 936-P (Belt Drive, Air Cooled)

NOTE: This is a new type generator with three insulated leads. As viewed from the commutator end, and reading from left to right, they are—1. Insulated main brush 2. Third brush. 3. Field.

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	12	1250	7.5
4	875	6.9	16	1600	7.9
8	1000	7.2	20	2400 (Max.)	8.2

Motoring Freely—3 1/2 to 4 amps. at 6 volts.

Max. Stall Current—32 to 34 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Retighten.

RELAY-REGULATOR

Delco-Remy, 5594

For Data see page 1396 (Late 1936).

LIGHTING

Switch—Delco-Remy, 479-N (with built in Thermostatic Current Limit Relay on Switch; used on cars with parking bulbs in head lights).

Location—Behind instrument board.

Dash Light Switch—Delco-Remy, 1404.

Horn Relay—Delco-Remy, 268-W.

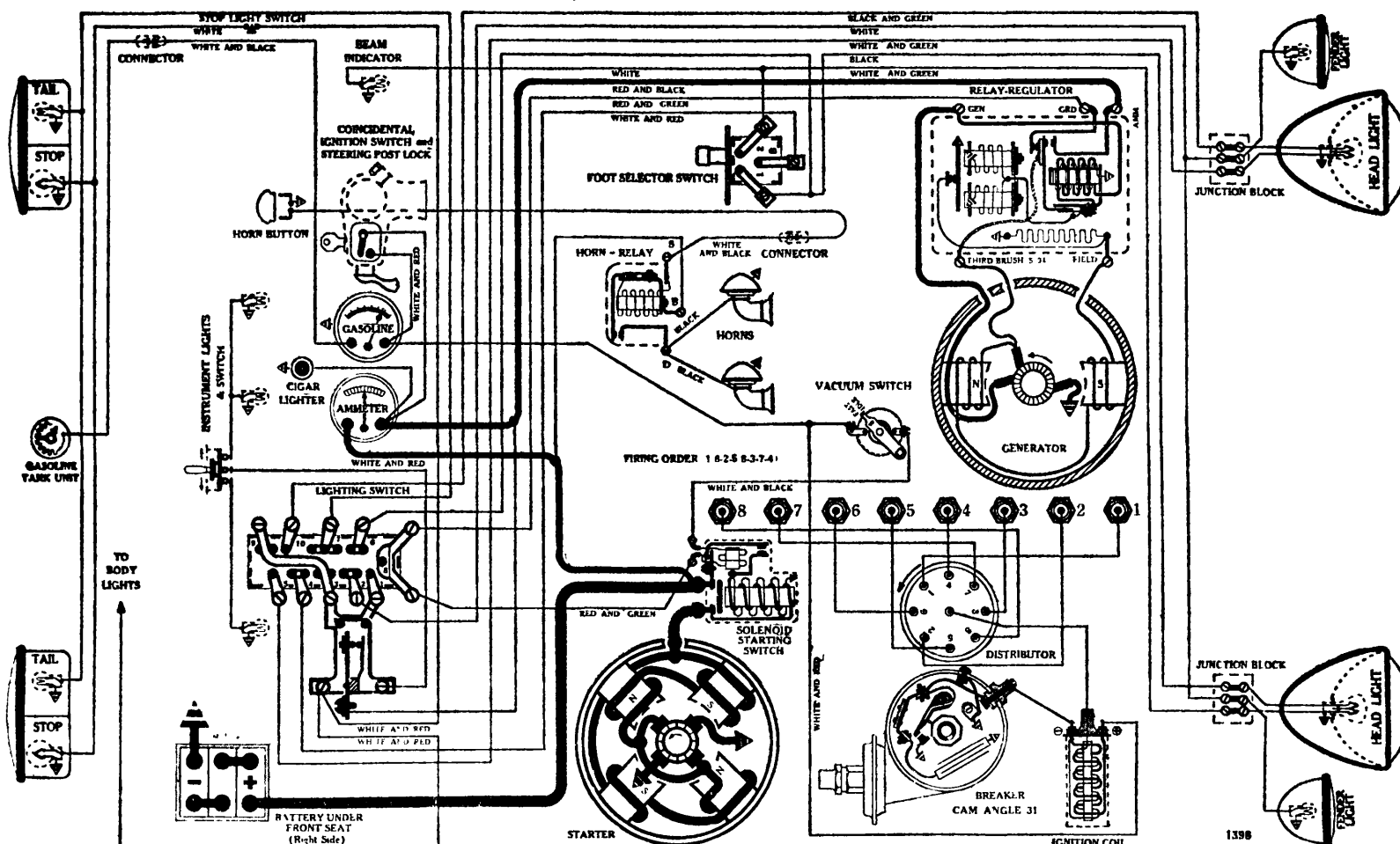
Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; FENDER—55; MAP LIGHT—55; BEAM INDICATOR—51; INSTRUMENT—51; DOME—81; STOP—87; TAIL—63.

BUICK

 Engine { Bore 3-7/16
Stroke 4-5/16

S ries 36-60 and 80, Roadmaster Straight Eights, (Late 1936)



BATTERY

Delco-Remy, 15-G, 6 volts. Negative Terminal Grounded
Starting Capacity—137 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—4.
Lighting Capacity—5.7 amps. for 20 hours (114 amp. hour).
Box—Length, 10-9/32; width, 7; height, 9 1/4 inches.

STARTER

D-R Test 396 Rotation, L. H., Com. End Group 47
Delco-Remy, 727-W
For Data see page 1395 (Early 1936).

IGNITION

D-R Test 1000 Rotation, L. H., Top View Group 63
Delco-Remy, 663-E
(Full Automatic Spark Advance in conjunction with Delco-Remy 680-R Vacuum Advance Unit, which controls position of Breaker Plate.)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "ADV" (cut in flywheel and filled with white paint) registers with line at flywheel inspection hole. With pointer under No. 1 Dist. Cap Terminal, breaker points should just open.

Octane Selector—Observe position of reference pointer index line. This line should be at "0" on scale after above timing procedure. If it is not, loosen pointer locking screw using a 3/16 inch Allen set screw wrench, and bring pointer to correct position. Relock the set screw.

Spark Plugs—18-MM (AC type H-9); Gap .020 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance Unit (Delco-Remy 680 R; test No. 665) -5 to 6 1/2 degrees (Dist. advance). Start with vacuum of from 5 to 7 inches mercury. Requires vacuum of from 10 to 13 inches for full travel.

Automatic Advance - 15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
400	200		3
570	285		7
800 (Intermediate)	400		9
1250	625		11
1700	850		15
2600 (Max.)	1300		

Ignition Coil—Delco-Remy, 536-H.

Ignition Switch—Oakes Steering Post and Ignition Lock. Model 36-60, No. 301250; Model 36-80, No. 301255.

GENERATOR

D-R Test 1250 Rotation, L. H., Com. End Group 24
Delco-Remy, 936-P (Belt Driv., Air Cooled)

NOTE: This is a new type generator with three insulated leads. As viewed from the commutator end, and reading from left to right, they are:—1. Insulated main brush 2. Third brush 3. Field.

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	12	1250	7.5
4	875	6.9	16	1600	7.9
8	1000	7.2	20	2400 (Max.)	8.2

Motoring Freely—3 1/2 to 4 amps. at 6 volts.

Max. Stall Current—32 to 34 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAY-REGULATOR

Delco-Remy, 5594

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator. Terminal stamped "3B" used in solenoid relay circuit, and should be connected to third brush lead on generator.

Cut-Out Relay—Closes—6.4 to 6.8 volts.

Opens—0 to 3.5 amps. discharge.

Contact Gap—.018 to .025 inch.

Core Gap—.018 to .022 inch, contacts closed.

Regulator—Contact Spring Tension—.7 to .9 oz. (measured at contacts).

Air Gap—.028 to .040 inch (armature pressed down against lower stop).

Contact Opening—.008 to .013 inch (armature pressed down against lower stop).

Armature Travel—.028 to .040 inch (armature released).

Points Open—8.35 to 8.65 volts (70° F.).

Points Close—7.3 to 7.7 volts (70° F.).

Solenoid Relay (Located in Solenoid Unit):

Closes—3.6 to 4 volts (max.).

Opens—1.6 to 2. volts.

Contact Gap—.030 to .045 inch.

Core Gap—.010 to .014 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 479-F (with Delco-Remy, 1863582 Thermo-static Current Limit Relay which is attached to Terminals Nos. 1 and 3 on switch back).

Location—Behind instrument board.

Dash Light Switch—Delco-Remy, 1404.

Horn Relay—Delco-Remy, 268-W.

Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320;

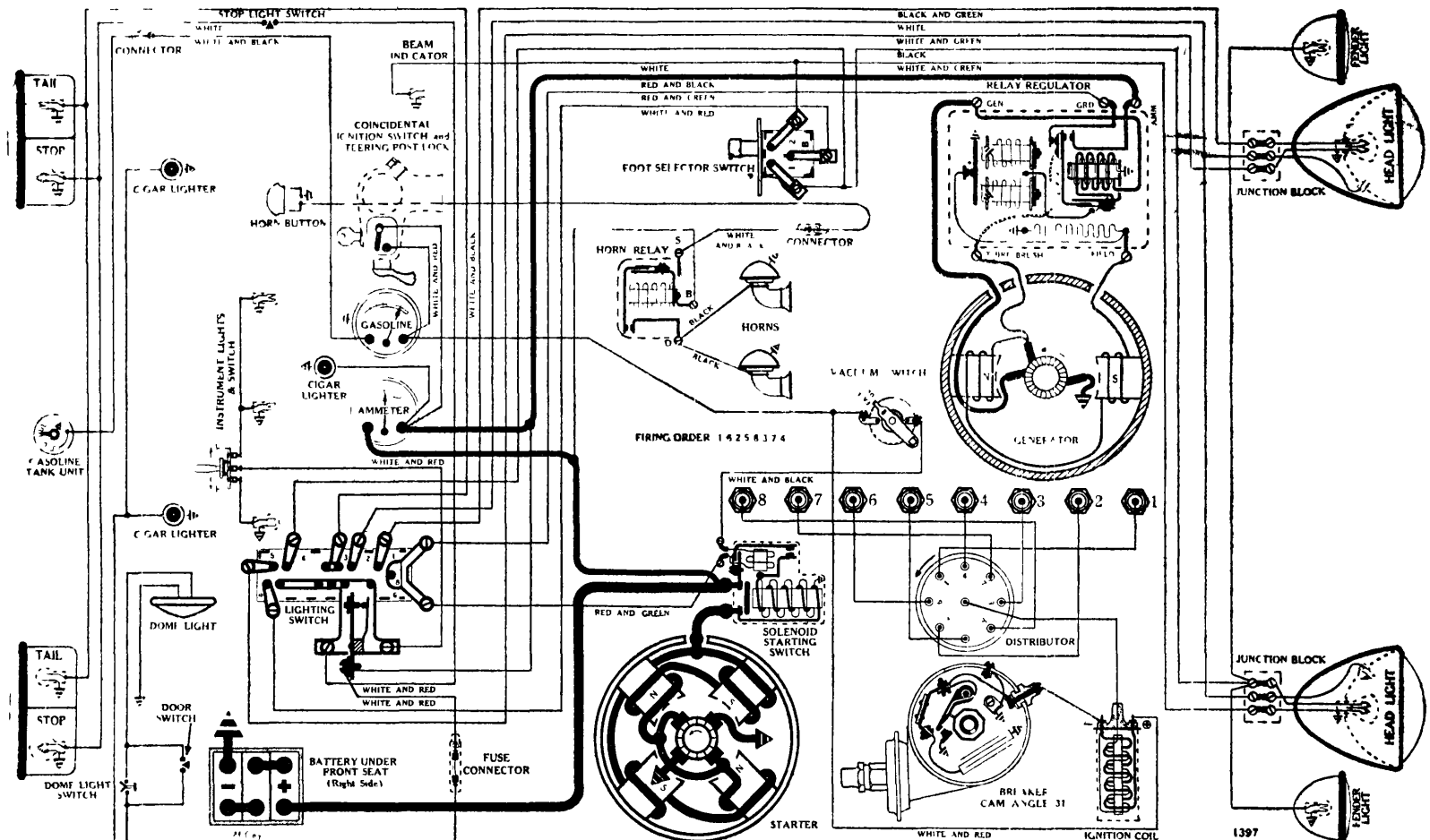
FENDER—55; MAP LIGHT—55; BEAM INDICATOR—51;

INSTRUMENT—51; DOME—81; STOP—87; TAIL—63.

BUICK

Series 36-90, Limited Straight Eight, (Early 1936)

Engine { Bore 3-7/16
Stroke 4-5/16



BATTERY

Delco-Remy, 15-G, 6 volts. Negative Terminal Grounded
Starting Capacity—137 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—4.
Lighting Capacity—5.7 amps. for 20 hours (114 amp. hour).
Box—Length, 10-9/32; width, 7; height, 9 1/2 inches.

STARTER

D-R Test 396 Rotation, L. H., Com. End Group 47
Delco-Remy, 727-W

Connection to Engine—Mechanical pinion shift incorporating an over running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch, remote control relay (located in the solenoid unit), an auxiliary set of insulated points found on the cut out relay armature, and the third brush lead wire found on the generator.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—160 amps. at 4.9 volts.

Engine Cranking Speed—96 R.P.M.

Stall Data (on Car)—380 amps. at 3 volts.

Lock Torque (for test bench use)—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1512.

Vacuum Starting Control Switch—Delco-Remy, 1601. Contacts should close when turned thru 10 to 12 degrees L H from latch position. Requires a vacuum of from 3.4 to 4.6 inches of mercury to unlatch vacuum switch from approximately a 30 degree latch position.

Armature—Delco-Remy, 820158.

IGNITION

D-R Test 1000 Rotation, L. H., Top View Group 63
Delco-Remy, 663-E

(Full Automatic Spark Advance in conjunction with Delco-Remy 663-E Vacuum Advance Unit, which controls position of Breaker Plate.)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "ADV" (cut in flywheel and filled with white paint) registers with line at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Octane Selector—Observe position of reference pointer index line. This line should be at "O" on scale after above timing procedure. If it is not, loosen pointer locking screw using a 3/16 inch Allen set screw wrench, and bring pointer to correct position. Relock the set screw.

Spark Plugs—18-MM (AC type H-9); Gap .020 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance Unit (Delco-Remy 680-R; test No. 685)—5 to 6 1/2 degrees (Dist. advance). Starts with vacuum of from 5 to 7 inches mercury. Requires vacuum of from 10 to 13 inches for full travel.

Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400	200	Start
570	285	3
690	345	5
800 (Intermediate)	400	7
1250	625	9
1700	850	11
2600 (Max.)	1300	15

Ignition Coil—Delco-Remy, 536-H.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301255.

GENERATOR

D-R Test 1250 Rotation, L. H., Com. End Group 24
Delco-Remy, 936-P (Belt Drive, Air Cooled)

NOTE: This is a new type generator with three insulated leads. As viewed from the commutator end, and reading from left to right, they are—1 Insulated main brush, 2 Third brush, 3 Field.

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	12	1250	7.5
4	875	6.9	16	1600	7.9
8	1000	7.2	20	2400 (Max.)	8.2

Motoring Freely—3 1/2 to 4 amps. at 6 volts.

Max. Stall Current—32 to 34 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAY-REGULATOR

Delco-Remy, 5594
For Data see page 1398 (Late 1936).

LIGHTING

Switch—Delco-Remy, 479-N (with built in Thermostatic Current Limit Relay on Switch; used on cars with parking bulbs in head lights).

Location—Behind instrument board.

Fuses—Dome Light Circuit, single 30 amp. fuse (type 3A-30) in fuse connector on wire attached to terminal No. 6 on lighting switch.

Dash Light Switch—Delco-Remy, 1404.

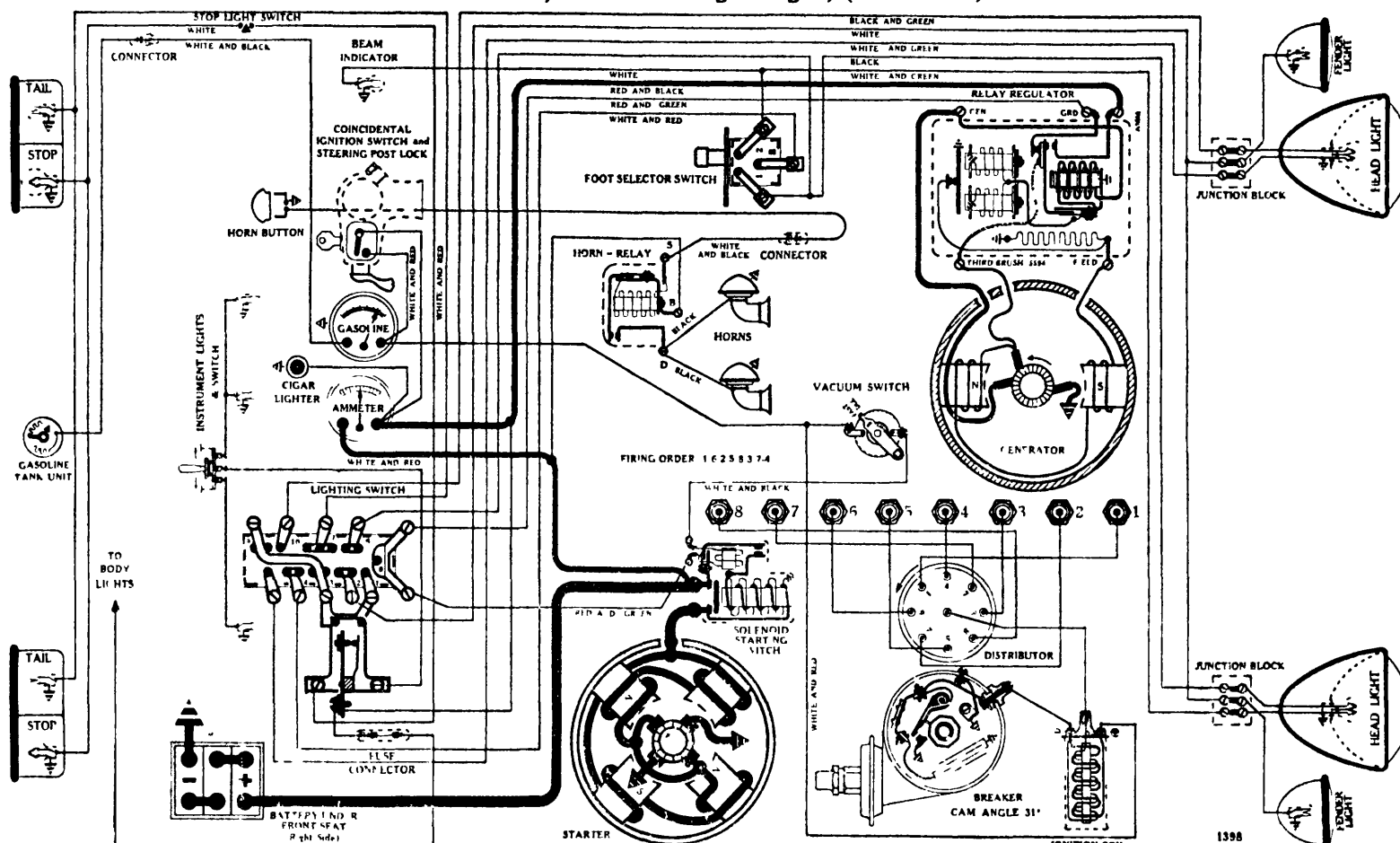
Horn Relay—Delco-Remy, 268-W.

Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; FENDER—55; MAP LIGHT—55; BEAM INDICATOR—51; INSTRUMENT—51; DOME—81; STOP—87; TAIL—63.

BUICK

S r i s 36-90, Limit d Straight Eight, (Lat 1936)

Engin { B re 3-7/16
Strok 4-5/16

BATTERY

Delco-Remy, 15-G, 6 volts. Negative Terminal Grounded

Starting Capacity—137 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—4.

Lighting Capacity—5.7 amps. for 20 hours (114 amp. hour).

Box—Length, 10-9/32; width, 7; height, 9 1/8 inches.

STARTER

D-R Test 396

Rotation, L. H., Com. End

Group 47

Delco-Remy, 727-W

For Data see page 1397 (Early 1936).

IGNITION

D-R Test 1000

Rotation, L. H., Top View

Group 63

Delco-Remy, 663-E

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-R Vacuum Advance Unit, which controls position of Breaker Plate.)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "ADV" (cut in flywheel and filled with white paint) registers with line at flywheel inspection hole. With rotor under No. 1 Dist. Cap terminal, breaker points should just open.

Octane Selector—Observe position of reference pointer index line. This line should be at "0" on scale after above timing procedure. If it is not, loosen pointer locking screw using a 3/16 inch Allen set screw wrench, and bring pointer to correct position. Relock the set screw.

Spark Plugs—18-MM (AC type H-9); Gap .020 to .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance Unit (Delco-Remy, 680-R; test No. 665)—5 to 6 1/2 degrees (Dist. advance). Starts with vacuum of from 5 to 7 inches mercury. Requires vacuum of from 10 to 13 inches for full travel.

Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400	200	Start
570	285	3
690	345	5
800 (Intermediate)	400	7
1250	625	9
1700	850	11
2600 (Max.)	1300	15

Ignition Coil—Delco-Remy, 536-H.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301255.

GENERATOR

D-R Test 1250

Rotation, L. H., Com. End

Group 24

Delco-Remy, 936-P (Belt Drive, Air Cooled)

NOTE: This is a new type generator with three insulated leads. As viewed from the commutator end, and reading from left to right, they are—1 Insulated main brush, 2 Third brush, 3 Field.

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	12	1250	7.5
4	875	6.9	16	1600	7.9
8	1000	7.2	20	2400 (Max.)	8.2

Motoring Freely—3 1/2 to 4 amps. at 6 volts.

Max. Stall Current—32 to 34 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction to increase charging rate. Relock.

RELAY-REGULATOR

Delco-Remy, 5594

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator. Terminal stamped "3B" used in solenoid relay circuit, and should be connected to third brush lead on generator.

Cut-Out Relay—Closes—6.4 to 6.8 volts.

Opens—0 to 3.5 amps. discharge.

Contact Gap—.018 to .025 inch.

Core Gap—.018 to .022 inch, contacts closed.

Regulator—

Contact Spring Tension—.7 to .9 oz. (measured at contacts).

Air Gap—.028 to .040 inch (armature pressed down against lower stop).

Contact Opening—.008 to .013 inch armature pressed down against lower stop.

Armature Travel—.028 to .040 inch (armature released).

Points Open—8.35 to 8.65 volts (70° F.).

Points Close—7.3 to 7.7 volts (70° F.).

Solenoid Relay

(Located in Solenoid Unit):

Closes—3.6 to 4 volts (max.).

Opens—1.6 to 2. volts.

Contact Gap—.030 to .045 inch.

Core Gap—.010 to .014 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 479-F (with Delco-Remy, 1863582 Thermostatic Current Limit Relay which is attached to Terminals Nos. 1 and 3 on switch back).

Location—Behind instrument board.

Fuses—Dome Light Circuit, single 30 amp. fuse (type 3A-30) in fuse connector on wire attached to the feed terminal on the thermostatic current limit relay.

Dash Light Switch—Delco-Remy, 1404.

Horn Relay—Delco-Remy, 268-W.

Foot Selector Switch—Delco-Remy, 471-T.

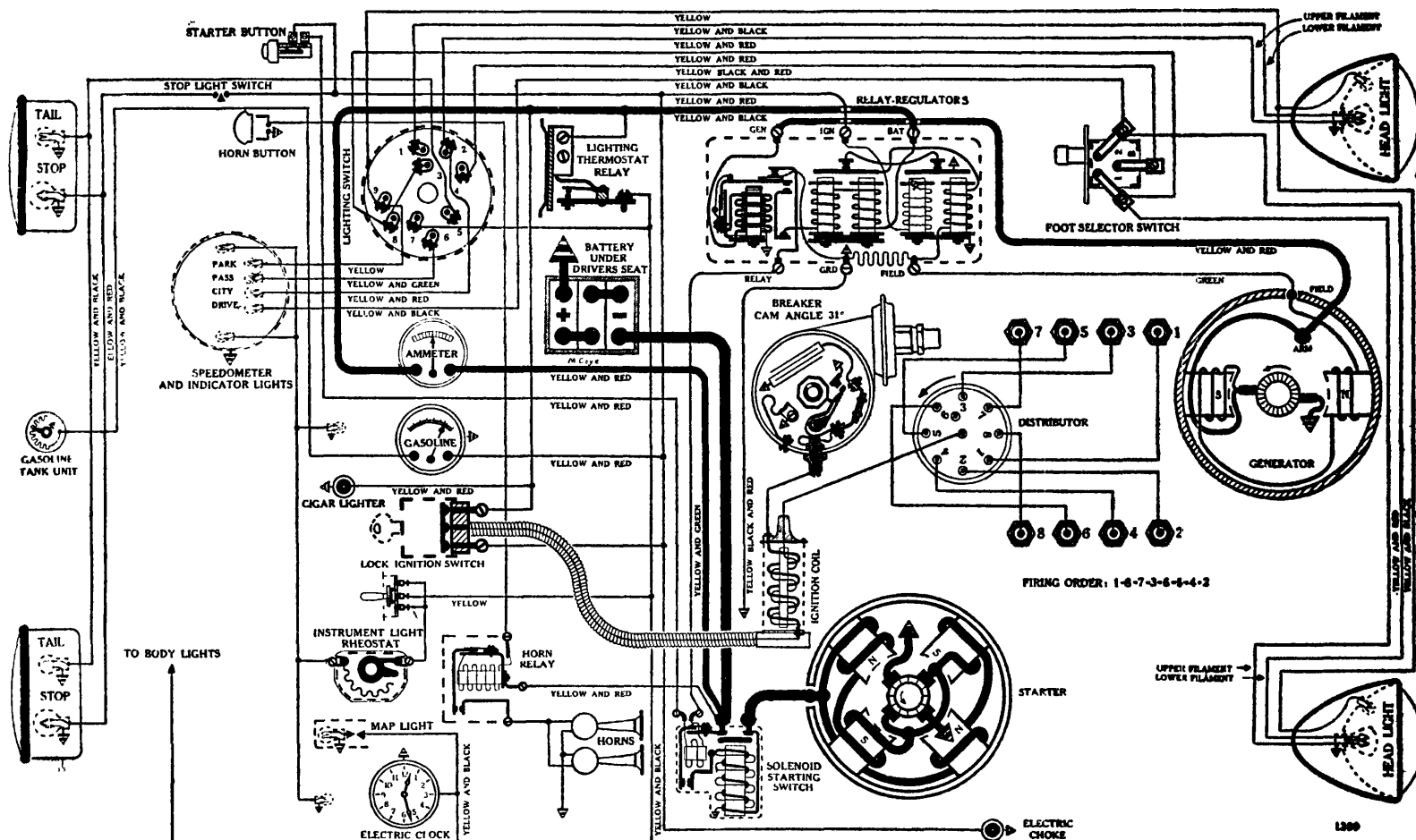
Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; FENDER—55; MAP LIGHT—55; BEAM INDICATOR—51; INSTRUMENT—51; DOME—81; STOP—87; TAIL—63.

36-60 Engine { Bore 3-3/8
Stroke 4-1/2

CADILLAC

36-70 & 75 Engine { Bore 3-1/2
Stroke 4-1/2

Mod ls 36-60, 36-70, 36-75, 90 Degree "Ve" 8, (1936)

**BATTERY**

Delco-Remy, 17-D, 6 volts. Positive Terminal Grounded
Starting Capacity—156 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—5.
Lighting Capacity—6.5 amps. for 20 hours (130 amp. hour).
Box—Length, 11 1/4; width, 7; height, 9 1/2 inches.

STARTER

D-R Test 396 Rotation, L. H., Com. End Group 47
Delco-Remy, 727-V

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch located on the instrument board, working in conjunction with a remote control relay (located in solenoid unit), and an auxiliary set of grounding points located on cut-out relay armature in the apparatus box. Feed for solenoid control circuit is taken from the ignition switch.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—150 amps. at 5.5 volts.

Engine Cranking Speed—84 R.P.M.

Stall Data (on Car)—450 amps. at 4 volts.

Lock Torque (for test bench use)—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1512.

Push Button Starting Control Switch—Delco-Remy, 1405, Model 36-60; Delco-Remy, 1407, Models 36-70 and 75.

Armature—Delco-Remy, 820158.

IGNITION

D-R Test 113 Rotation, L. H., Top View Group 63
Delco-Remy, 663-G

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-X Vacuum Advance Unit, which controls position of Breaker Plate)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Distributor Quadrant—Before timing ignition, set pointer in line with "O" graduation on scale.

Timing—Slowly turn engine until No. 1 piston (front cylinder, left bank) is coming up on compression stroke. Stop when "IG" mark on shaft pulley, located 5 degrees or 1/4 inch ahead of T.D.C., registers with the pointer on the timing chain case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-7); Gap .025 to .027 inch.

Firing Order—1-8-7-3-6-5-4-2.

NOTE: All odd cylinder numbers on left bank, No. 1 nearest radiator. All even numbers on right bank (see diagram).

Vacuum Advance Unit (Delco-Remy 680-X; test No. 675)—7 1/2 degrees (Dist. advance). Starts with vacuum of from 9 to 11 inches mercury. Requires vacuum of from 16 to 18 inches for full travel.

Automatic Advance—12 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
870	435	Start
1390	695	2
1910	955	4
2430	1215	6
2950	1475	8
3470	1735	10
4000 (Max.)	2000	12

Ignition Coil—Delco-Remy, 539-C.

Ignition Switch and Cable—Delco-Remy, 431-L, Model 36-60; Delco-Remy, 431-Z, Models 36-70 and 75.

GENERATOR

D-R Test 1601 Rotation, L. H., Com. End Group 61
Delco-Remy, 961-E (Belt Drive, Air Cooled)

NOTE: This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating point current and voltage regulators. The regulator must be used when testing these generators.

Performance Data—Gen. cold. Voltage regulator points short circuited together with jump wire.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	650	6.2	14	1440	7.6
4	880	6.6	18	1670	7.9
8	1100	7.0	20	1900 (Max.)	8.3

Motoring Freely—3 amps. at 6 volts.

Max. Stall Current—22 to 24 amps. at 5 volts.

Field Test—1.7 to 1.9 amps. at 6 volts across field coils in series.

Brush Spring Tension—22 to 26 oz. on each (new brushes).

Armature—Delco-Remy, 1857866.

Charging Adjustment—No third brush. External vibrating point current and voltage regulation.

RELAY-REGULATORS

Delco-Remy, 5559

For special instructions on units of this type see "Delco-Remy Combination Vibrating Point Current and Voltage Regulators" in Technical Section. Adjustment data found in "Delco-Remy Control Units Specifications", Technical Section.

LIGHTING

Switch—Delco-Remy, 487-N.

Location—Behind instrument board.

Horn Relay—Delco-Remy, 266-TK.

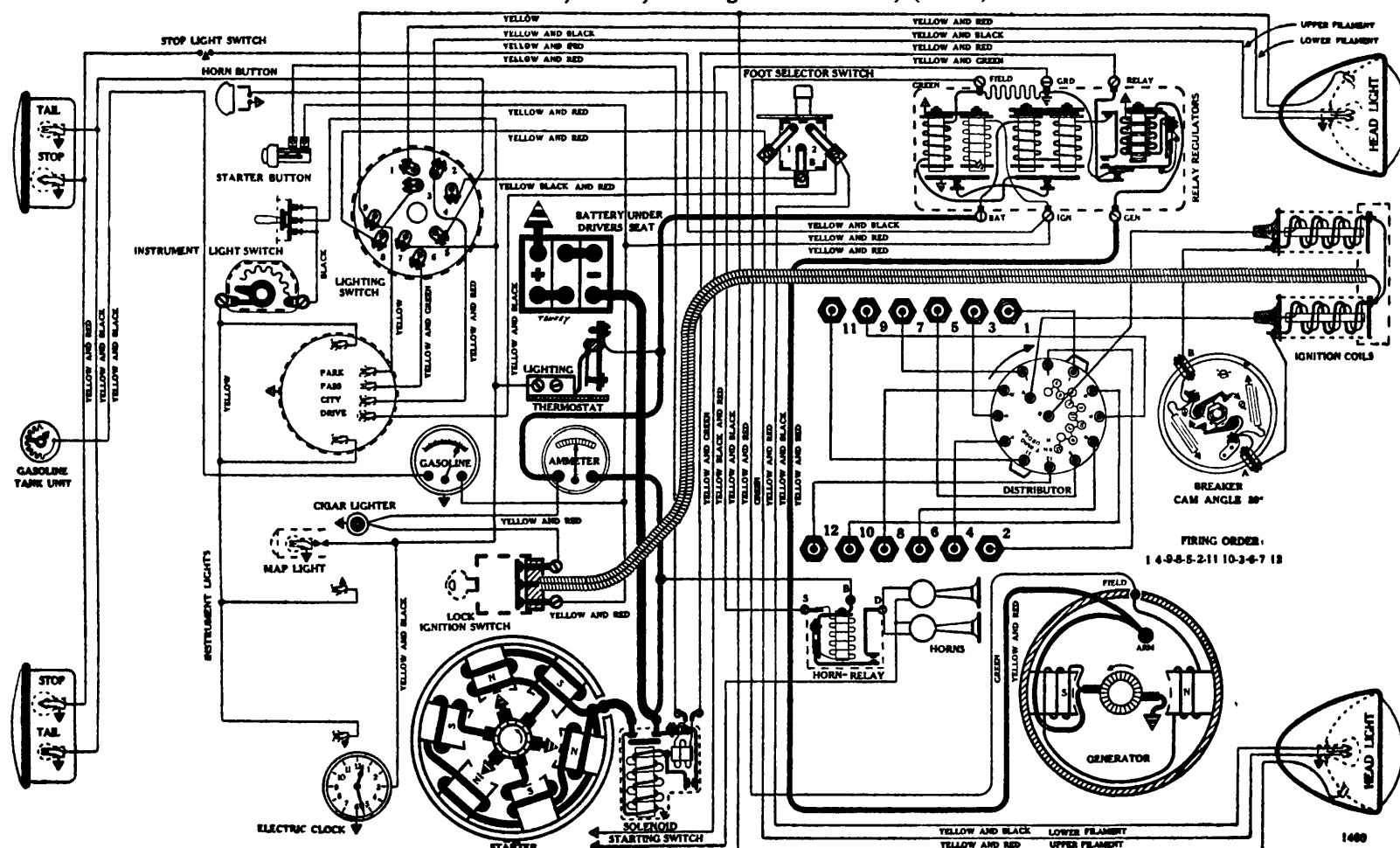
Thermostatic Lighting Current Limit Relay—Delco-Remy, 411-A.

Foot Selector Switch—Delco-Remy, 471-Z.

Lamps—Refer to "Lamp Data" in Technical Section HEAD—2330; PARK—55; INSTRUMENT—51; INDICATOR—51; DOME—87; STOP—87; TAIL—68.

CADILLAC

Models 36-80, 36-85, 45 D ree "V" 12, (1936)

Engine { Bor 3-1/8
Stroke 4

BATTERY

Delco-Remy, 21-D, 6 volts. Positive Terminal Grounded

Starting Capacity—195 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—6.5.

Lighting Capacity—8.2 amps. for 20 hours (164 amp. hour).

Box—Length, 13-9/16; width, 7; height, 9-3/16 inches.

STARTER

D-R Test 405

Rotation, L. H., Com. End

Group 17

Delco-Remy, 580

Connection to Engine—Mechanical pinion shift with self contained gear reduction and over running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch located on the instrument board, working in conjunction with a remote control relay (located in solenoid unit), and an auxiliary set of grounding points located on cut out relay armature in the apparatus box. Feed for solenoid control circuit is taken from the ignition switch.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843058.**Running Free**—70 amps. at 5.7 volts, 2200 R.P.M.**Cranking Engine**—140 amps. at 5.8 volts.**Engine Cranking Speed**—72 R.P.M.**Stall Data (on car)**—500 amps. at 4.5 volts.**Lock Torque (for test bench use)**—35 pound-feet, 600 amps. at 3 volts.**Brush Spring Tension**—36 to 40 oz. on each (new brushes).**Solenoid Starting Switch**—Delco-Remy, 1515.**Push Button Starting Control Switch**—Delco-Remy, 1407.**Armature**—Delco-Remy, 1837058.

IGNITION

D-R Test 1914

Rotation, R. H., Top View

Group 67

Delco-Remy, 667-C

(Full Automatic Spark Advance)

NOTE—The Delco Remy 667 C Distributor has been used on Cadillac V12 auto mobiles since 1934. By referring back to data issued in previous years it will be found that the figures differ somewhat from the following. This is due to changes made in official data furnished us by the Delco Remy Corporation.

Breakers—Contact separation .018 inch.**Cam Angles**—Points closed 39 degrees; open 21 degrees.**Contact Spring Tension**—17 to 21 oz. on each.**Synchronizing**—Stationary points fire left hand block. Movable points open 37½ degrees after stationary. Unequal intervals of 37½-22½-37½, etc. degrees between interruptions.**Timing**—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "IGA" (which is 4 degrees or approximately ½ inch ahead of T D C) is opposite indicator. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.**Spark Plugs**—18-MM (AC type G-6); Gap .025 to .027 inch.**Firing Order**—1-4-9-8-5-2-11-10-3-6-7-12.**NOTE**—All odd cylinder numbers on left bank, No. 1 nearest radiator. All even numbers on right bank (see diagram).**Automatic Advance**—19 degrees (Distributor).

Eng. R.P.M.

Dist. R.P.M.

Degrees Advance (Dist.)

510	255	Start
1600 (1st Intermediate)	800	12
2200 (2nd Intermediate)	1100	16
2800 (Max.)	1400	19

Ignition Coil—Delco-Remy, 553-E.

Ignition Switch and Cable—Delco-Remy, 435-A.

GENERATOR

D-R Test 1602

Rotation, L. H., Com. End

Group 28

Delco-Remy, 933-M (Belt Drive, Air Cooled)

NOTE—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating point current and voltage regulators. The regulator must be used when testing these generators.

Performance Data—Gen. cold. Voltage regulator points short circuited together with jump wire.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	650	6.5	12	890	7.1
1	665	6.5	13	915	7.1
2	680	6.6	14	940	7.2
3	700	6.6	15	970	7.2
4	720	6.7	16	1000	7.3
5	735	6.7	17	1030	7.3
6	755	6.8	18	1060	7.4
7	780	6.8	19	1090	7.4
8	800	6.9	20	1130	7.5
9	820	6.9	21	1160	7.5
10	840	7.	22	1200 (Max.)	7.6

Motoring Freely—2.7 to 3 amps. at 6 volts.**Max. Stall Current**—22 to 24 amps. at 5 volts.**Field Test**—1.7 to 2.0 amps. at 6 volts across field coils in series.**Brush Spring Tension**—22 to 26 oz. on each (new brushes).**Armature**—Delco-Remy, 1854448.

RELAY-REGULATORS

Delco-Remy, 5559

For special instructions on units of this type see "Delco Remy Combination Vibrating Point Current and Voltage Regulators" in Technical Section. Adjustment data found in "Delco-Remy Control Units Specifications", Technical Section.

LIGHTING

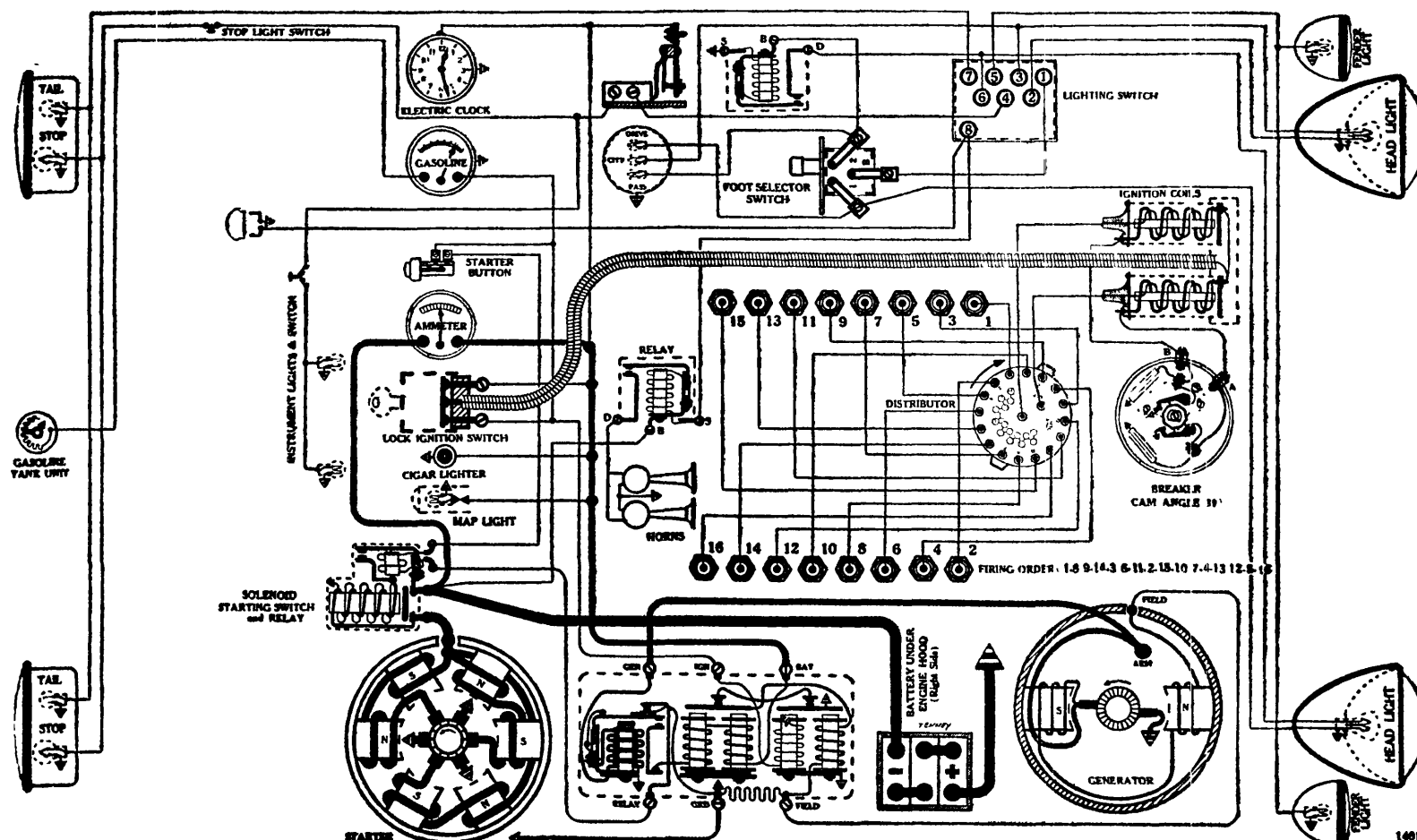
Switch—Delco-Remy, 487-N.**Location**—Behind instrument board.**Horn Relay**—Delco-Remy, 266-TK.**Thermostatic Lighting Current Limit Relay**—Delco-Remy, 411-A.**Foot Selector Switch**—Delco-Remy, 471-Z.**Lamps**—Refer to "Lamp Data" in Technical Section. HEAD—2330;

PARK—55; INSTRUMENT—51; INDICATOR—51; DOME—87;

STOP—87; TAIL—68.

CADILLAC

Model 36-90, 45 D gree "Vee" 16, (1936)

Engine { Bore 3
Strok 4

BATTERY

Delco-Remy, 25-A, 6 volts. Positive Terminal Grounded
Starting Capacity—234 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—8.5.
Lighting Capacity—9.8 amps. for 20 hours (196 amp. hour).
Box—Length, 16-3/16; width, 7; height, 9-3/16 inches.

STARTER

D-R Test 405 Rotation, L. H., Com. End Group 17
Delco-Remy, 580

Connection to Engine—Mechanical pinion shift with self-contained gear reduction and overrunning clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch located on the instrument board, working in conjunction with a remote control relay (located in solenoid unit), and an auxiliary set of grounding points located on cut out relay armature in the apparatus box. Feed for solenoid control circuit is taken from the ignition switch.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843058.

Running Free—70 amps. at 5.7 volts, 2200 R.P.M.

Cranking Engine—150 amps. at 5.8 volts.

Engine Cranking Speed—84 R.P.M.

Stall Data (on car)—550 amps. at 4.6 volts.

Lock Torque (for test bench use)—35 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—36 to 40 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1515.

Push Button Starting Control Switch—Delco-Remy, 1379 or 1407.

Armature—Delco-Remy, 1837058.

IGNITION

D-R Test 1043 Rotation, R. H., Top View Group 26
Delco-Remy, 4118
(Full Automatic Spark Advance)

NOTE: The Delco-Remy 4118 Distributor has been used on Cadillac V-16 auto mobiles since 1934. By referring back to data issued in previous years it will be found that the figures differ somewhat from the following. This is due to changes made in official data furnished us by the Delco-Remy Corporation.

Breakers—Contact separation .014 to .018 inch.

Cam Angles—Points closed 31 degrees; open 16 degrees.

Contact Spring Tension—17 to 21 oz. on each.

Synchronizing—Stationary points fire left hand block. Movable points open 22½ degrees after stationary. Equal 22½ degree intervals between interruptions.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "IG-A" (which is 4 degrees or approximately ½ inch ahead of T.D.C.) is opposite indicator. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—18-MM (AC type G-6); Gap .025 to .027 inch.

Firing Order—1-8-9-14-3-6-11-2-15-10-7-4-13-12-5-16.

NOTE: All odd cylinder numbers on left bank, No. 1 nearest radiator. All even numbers on right bank (see diagram).

Automatic Advance—17 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
260	130	Start
600	300	3
1050	525	7
1510	755	11
2200 (Max.)	1100	17

Ignition Coil—Delco-Remy, 553-E.

Ignition Switch and Cable—Delco-Remy, 431-F.

GENERATOR

D-R Test 1602 Rotation, L. H., Com. End Group 28
Delco-Remy, 933-M (Belt Drive, Air Cooled)

NOTE: This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating point current and voltage regulators. The regulator must be used when testing these generators.

Performance Data—Gen. cold. Voltage regulator points short circuited together with jump wire.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	650	6.5	12	890	7.1
1	665	6.5	13	915	7.1
2	680	6.6	14	940	7.2
3	700	6.6	15	970	7.2
4	720	6.7	16	1000	7.3
5	735	6.7	17	1030	7.3
6	755	6.8	18	1060	7.4
7	780	6.8	19	1090	7.4
8	800	6.9	20	1130	7.5
9	820	6.9	21	1160	7.5
10	840	7.	22	1200 (Max.)	7.6

Motoring Freely—2.7 to 3 amps. at 6 volts.

Max. Stall Current—22 to 24 amps. at 5 volts.

Field Test—1.7 to 2.0 amps. at 6 volts across field coils in series.

Brush Spring Tension—22 to 26 oz. on each (new brushes).

Armature—Delco-Remy, 1854448.

RELAY-REGULATORS

Delco-Remy, 5559

For special instructions on units of this type see "Delco-Remy Combination Vibrating Point Current and Voltage Regulators in Technical Section. Adjustment data found in "Delco-Remy Control Units Specifications", Technical Section.

LIGHTING

Switch—Delco-Remy, 487-H.
Location—On support foot of steering column.

Horn Relay—Delco-Remy, 266-TK.

Thermostatic Lighting Current Limit Relay—Delco-Remy, 411-A.

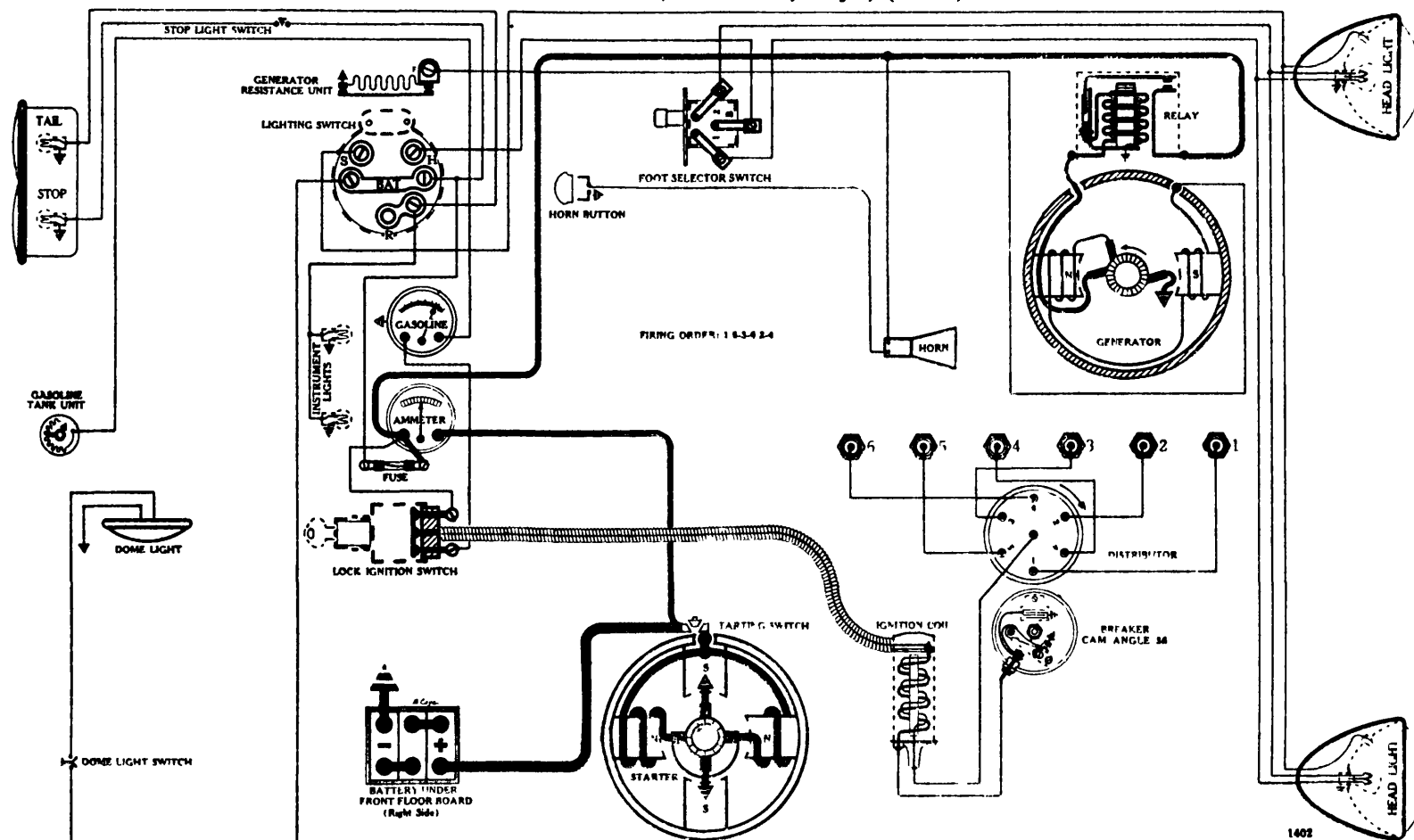
Lighting Relay—Delco-Remy, 266-T.

Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2330; FENDER—55; INSTRUMENT—51; INDICATOR—51; DOME—87; STOP—87; TAIL—63.

CHEVROLET

Mod 1 "Master", Series FA, 6 cyl., (1936)

Engine { Bore 3-5/16
Stroke 4

BATTERY

Delco-Remy, 15-X, 6 volts. Negative Terminal Grounded
Starting Capacity—115 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—2.75.
Lighting Capacity—4.7 amps. for 20 hours (94 amp. hour).
Box—Length, 8-15/16; width, 7; height, 8-9/16 inches.

STARTER

D-R Test 368 Rotation, L. H., Com. End Group 46
Delco-Remy, 738-G
For Data see page 1403 (Standard 1936).

IGNITION

D-R Test 112 Rotation, R. H., Top View Group 80
Delco-Remy, 645-T

(Pull Automatic Spark Advance in conjunction with Delco-Remy 680-L Vacuum Control, which moves the entire Distributor)

Breaker—Contact separation .018 inch.

Cam Angles—Points closed 36 degrees; open 24 degrees.

Contact Spring Tension—17 to 21 oz.

Timing—IMPORTANT! First set pointer on Octane Selector at zero graduation. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when steel ball, pressed into flywheel, (located 5 degrees or approximately 2 flywheel teeth ahead of T.D.C.) is opposite pointer at opening in right side of flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open. After completion of above operations the car should be road tested, and Octane Selector set for maximum economy and performance, for the grade of fuel being used. For peak performance the Octane Selector should be set to produce a slight "ping" upon a quick acceleration, with a wide open throttle. When accelerated from part throttle (20 to 25 miles per hour), the 17 degree vacuum spark advance will be most economical; however, should the "ping" be objectionable the spark range may be shortened 5 degrees by installing spark control stop No. 602111. **WARNING:** Do not attempt to eliminate this "ping" by changing the Octane Selector setting, as it will result in loss of engine power. Fig. 1 shows how the control spacer is attached. Remove Nut "A" and Lock Washer "B" by loosening screw "C". Install spacer as shown at "D", with prongs up.

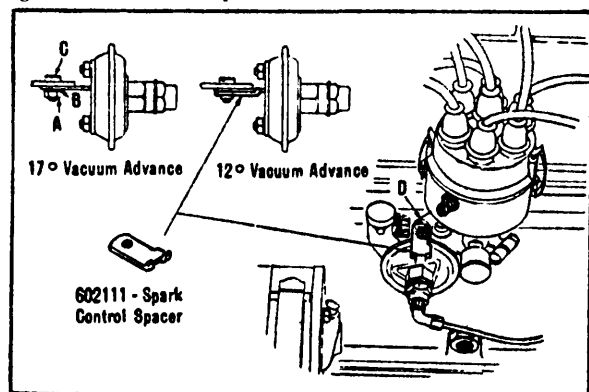


Fig. 1

Spark Plugs—14-MM (AC type K-11); Gap .032 to .035 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance Unit (Delco-Remy 680-L; test No. 667)—8 to 9 degrees (Dist. advance). Starts with vacuum of 5 inches mercury. Requires vacuum of from 9 to 11 inches for full travel.

Octane Selector—10 degrees advance or retard (Distributor).

Automatic Advance—14 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400	200	Start
770	385	2
1320	660	5
1880	940	8
2440	1220	11
3000 (Max.)	1500	14

Ignition Coil—Delco-Remy, 536-D.

Ignition Switch and Cable—Delco-Remy, 431-P.

GENERATOR

D-R Test 1250 Rotation, L. H., Com. End Group 29
Delco-Remy, 935-V (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	12	1250	7.5
4	875	6.9	16	1600	7.9
8	1000	7.2	20	2400 (Max.)	8.2

Motoring Freely—3½ to 4 amps. at 6 volts.

Max. Stall Current—32 to 34 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAY

Delco-Remy, 265-G

For Data see page 1403 (Standard 1936).

LIGHTING

Switch—Delco-Remy, 479-Y (with generator field resistance).

NOTE: This switch is so designed that by pulling knob one position the field resistance is shorted out, resulting in maximum charging, with no lights burning.

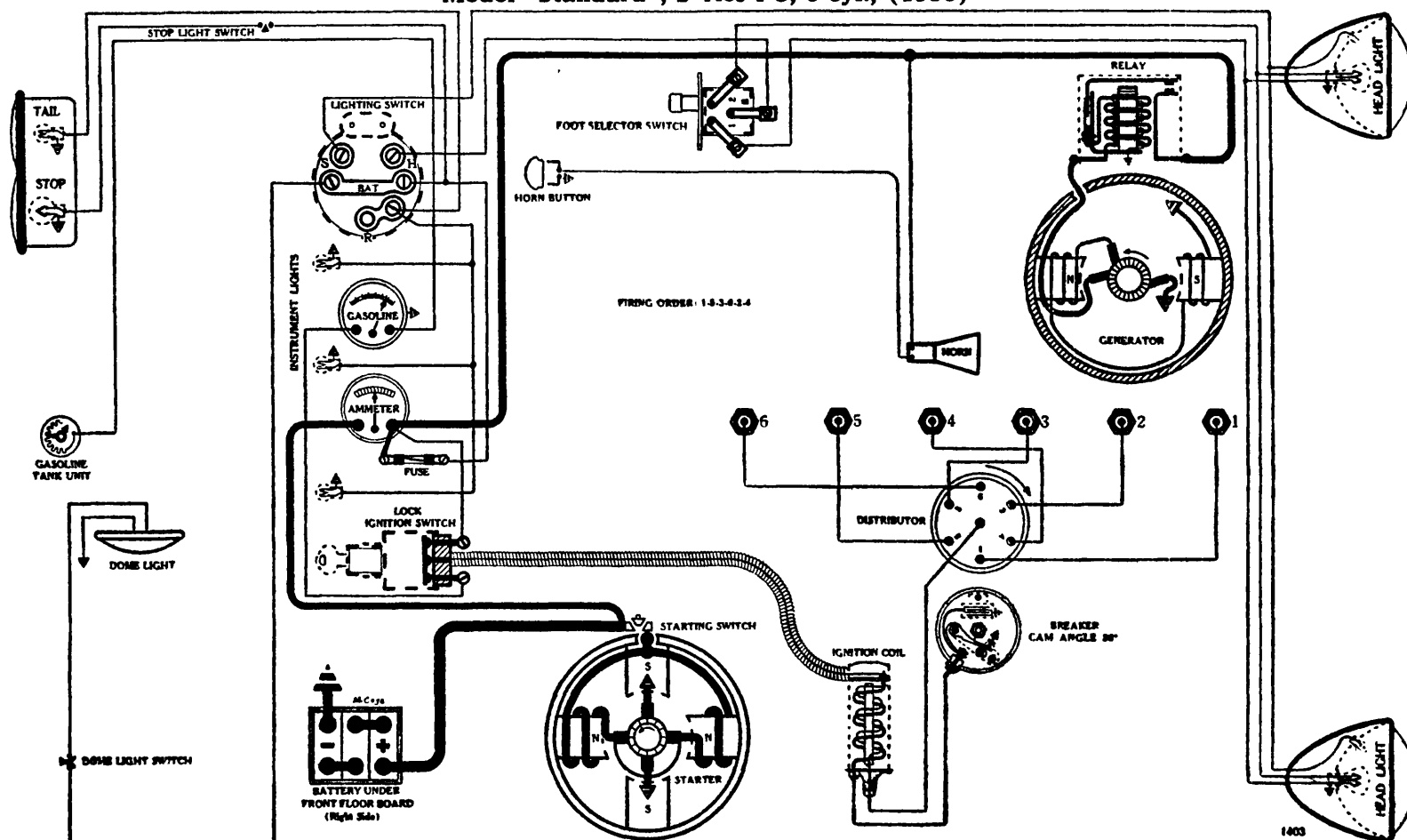
Fuses—Lighting Circuit, Single 20 amp. fuse (type 3A-20) mounted below ammeter. Stop Light Circuit, Single 20 amp. fuse (type 3A-20) in tubular holder in wire behind instrument board, near ignition switch.

Foot Selector Switch—Delco-Remy, 471-P.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; INSTRUMENT—51; DOME—81; STOP—63; TAIL—63.

CHEVROLET

Model "Standard", Series FC, 6 cyl., (1936)

Engine { B re 3-5/16
Strok 4**BATTERY**

Delco-Remy, 13-AC, 6 volts. Negative Terminal Grounded
 Starting Capacity—102 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—2.5.
 Lighting Capacity—4.30 amps. for 20 hours (86 amp. hour).
 Box—Length, 8-15/16; width, 7; height, 8-9/16 inches.

STARTER

D-R Test 368 Rotation, L. H., Com. End Group 46
 Delco-Remy, 738-G

Connection to Engine—Bendix Drive, Type A-1718.
 Running Free—65 amps. at 5 volts, 5000 R.P.M.
 Cranking Engine—100 amps. at 5.7 volts.
 Engine Cranking Speed—120 R.P.M.
 Stall Data (on Car)—300 amps. at 4.4 volts.
 Lock Torque (for test bench use)—12 pound-feet, 475 amps., 3.6 volts.
 Brush Spring Tension—24 to 28 oz. on each (new brushes).
 Starting Switch—Delco-Remy, 362941.
 Starterator Vacuum Unit—Delco-Remy, 1575.
 Armature—Delco-Remy, 1847432.

IGNITION

D-R Test 112 Rotation, R. H., Top View Group 80
 Delco-Remy, 645-T

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-L Vacuum Control, which moves the entire Distributor)

Breaker—Contact separation .018 inch.

Cam Angles—Points closed 36 degrees; open 24 degrees.

Contact Spring Tension—17 to 21 oz.

Timing—IMPORTANT! First set pointer on Octane Selector at zero graduation. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when steel ball, pressed into flywheel, (located 5 degrees or approximately 2 flywheel teeth ahead of T.D.C.) is opposite pointer at opening in right side of flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open. After completion of above operations the car should be road tested, and Octane Selector set for maximum economy and performance, for the grade of fuel being used. For peak performance the Octane Selector should be set to produce a slight "ping" upon a quick acceleration, with a wide open throttle. When accelerated from part throttle (20 to 25 miles per hour), the 17 degree vacuum spark advance will be most economical; however, should the "ping" be objectionable the spark range may be shortened 5 degrees by installing spark control stop No. 602111. WARNING: Do not attempt to eliminate this "ping" by changing the Octane Selector setting, as it will result in loss of engine power. Fig. 1 (on 1936 Chevrolet "Master") shows how the control spacer is attached. Remove Nut "A" and Lock Washer "B" by loosening screw "C". Install spacer as shown at "D", with prongs up.

Spark Plugs—14-MM (AC type K-11); Gap .032 to .035 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance Unit (Delco-Remy 680-L; test No. 687)—8 to 9 degrees (Dist advance). Starts with vacuum of 5 inches mercury. Requires vacuum of from 9 to 11 inches for full travel.

Octane Selector—10 degrees advance or retard (Distributor).

Automatic Advance—14 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400	200	Start
770	385	2
1320	660	5
1880	940	8
2440	1220	11
3000 (Max.)	1500	14

Ignition Coil—Delco-Remy, 536-D.

Ignition Switch and Cable—Delco-Remy, 431-P.

GENERATOR

D-R Test 268 Rotation, L. H., Com. End Group 41-A
 Delco-Remy, 946-C (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	600	6.5	12	1060	7.7
4	700	6.9	16	1400	8.1
8	850	7.3	18	1700 (Max.)	8.3

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—16 to 19 amps. at 6 volts.

Field Test—3½ to 4½ amps. at 6 volts across field coils in series.

Brush Spring Tension—14 to 18 oz. on each (new brushes).

Armature—Delco-Remy, 1841027.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAY

Delco-Remy, 265-G

Closes—6¾ to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 479-R.

Location—Behind instrument board. Operated by pull knob.

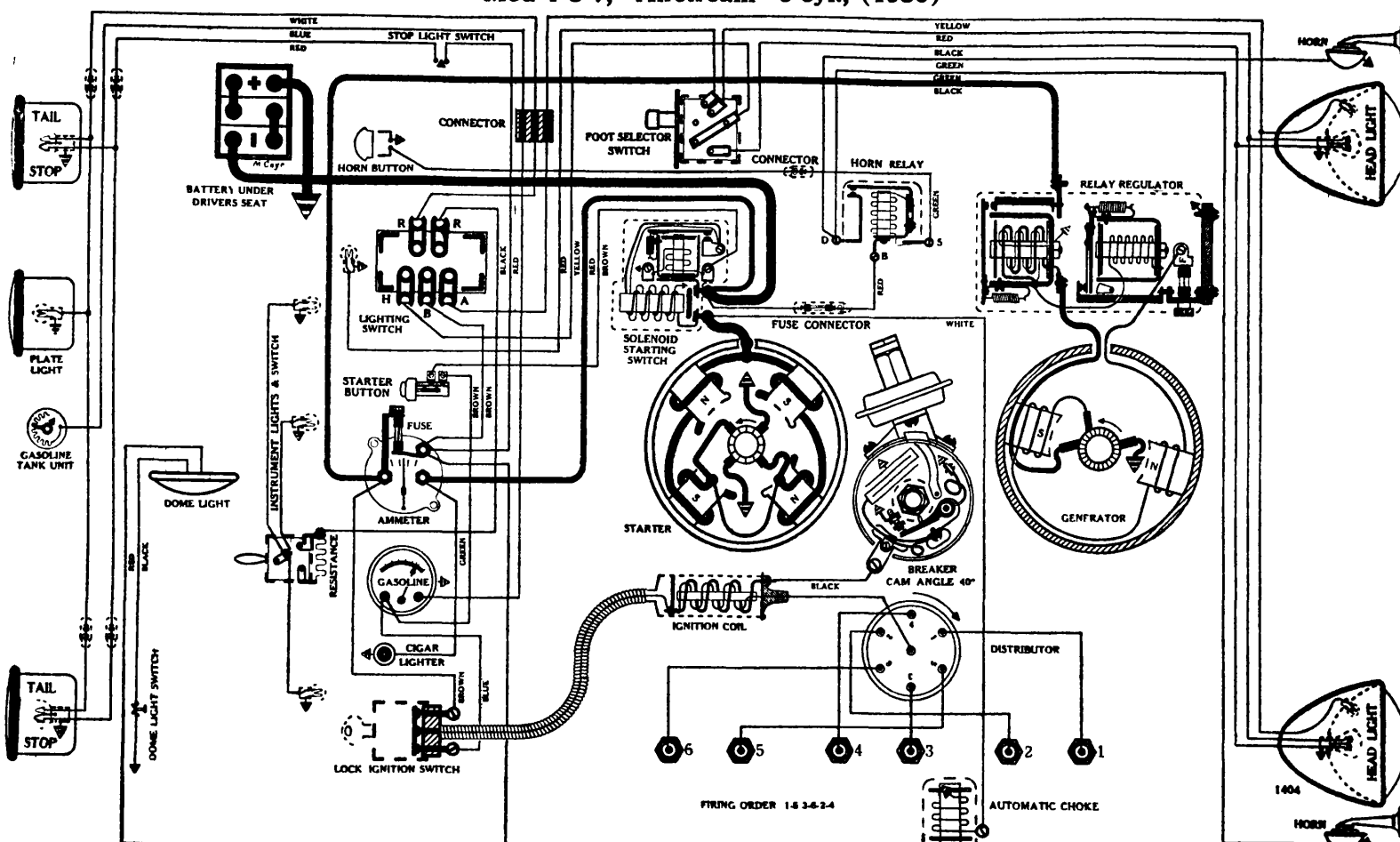
Fuses—Single 20 amp. fuse (type 3A-20) mounted below ammeter.

Foot Selector Switch—Delco-Remy, 471-P.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; INSTRUMENT—51; DOME—81; STOP—63; TAIL—63.

CHRYSLER

Mod 1 C-7, "Airstream" 6 cyl., (1936)

 Engin { Bor 3-3/8
 Strok 4-1/2


BATTERY

Willard, WH-2-15, 6 volts. Positive Terminal Grounded
 Starting Capacity—140 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—4.3.
 Lighting Capacity—5.9 amps. for 20 hours (119 amp. hour).
 Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

A-L Test CU-430 Rotation, L. H., Com. End
 Auto-Lite, MAX-4016

Connection to Engine—Mechanical pinion shift incorporating an over running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board, working in conjunction with a remote control relay (located in solenoid unit). One terminal of control relay is grounded thru its case.

Starter Pinion and Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5½ volts, 5300 R.P.M.

Cranking Engine—140 amps. at 5 volts.

Engine Cranking Speed—132 R.P.M.

Stall Data (on Car)—400 amps. at 2.99 volts.

Lock Torque (for test bench use)—16½ pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4104.

Armature—Auto-Lite, MAW-2030.

A-L Test 419 (IGS-4006-1)

IGNITION

A-L Test 478 (IGS-4006-A-1)

Rotation, R. H., Top View

Auto-Lite IGS-4006-1 or IGS-4006-A-1

(Full Automatic Spark Advance in conjunction with Auto-Lite IGS-1023-AS Vacuum Advance Unit, which controls position of Breaker Plate)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 40 degrees; open 20 degrees (by actual tests).

Cam Angles—Points closed 38 degrees; open 22 degrees (official A-L data).

Contact Spring Tension—16 to 20 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "zero" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact 1 D C) is directly under pointer on gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-9); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance Unit (Auto-Lite IGS-1023-AS, test No. 453 used on both distributors)—3 degrees (Dist. advance). Starts with vacuum of 5.1 inches mercury. Requires vacuum of 15 inches for full travel.

Automatic Advance—12 degrees (Distributor), both units.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
700	350	Start
800 (Intermediate)	400	3
1550	775	6
2300	1150	9
3060 (Max.)	1580	12

The following is the Spark Advance Table for the Auto-Lite IGS-4006-A-1 Distributor.

		Start
700	350	3
800 (Intermediate)	400	6
1700	850	9
2600	1300	12
3500 (Max.)	1750	

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4631;

A-L, IG-4638 (convertible coupe and sedan).

Ign. Coil Only—A-L, IG-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-CFS;

A-L, CE-1187-CWS (convertible coupe and sedan).

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4608-A-5

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	12	1275	7.4
4	875	6.8	16	1600	7.8
8	1075	7.	21	2400 (Max.)	8.1

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.

Field Fuse—5 amp. (type 1A-5) in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116-F.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY—REGULATOR

Auto-Lite, TC-4301-A

For Data see page 1405 (Straight Eight 1936)

LIGHTING

Switch—Chrysler, No. 655559.

Location—Behind instrument board.

Fuses—(Lighting) Single 20 amp. fuse (type 3A-20) in special bayonet type fuse holder, attached to back of ammeter. (If dual horns), 20 amp. (type 3A-20) in fuse connector on wire close to starting motor.

Horn Relay—Delco-Remy, 266-TK.

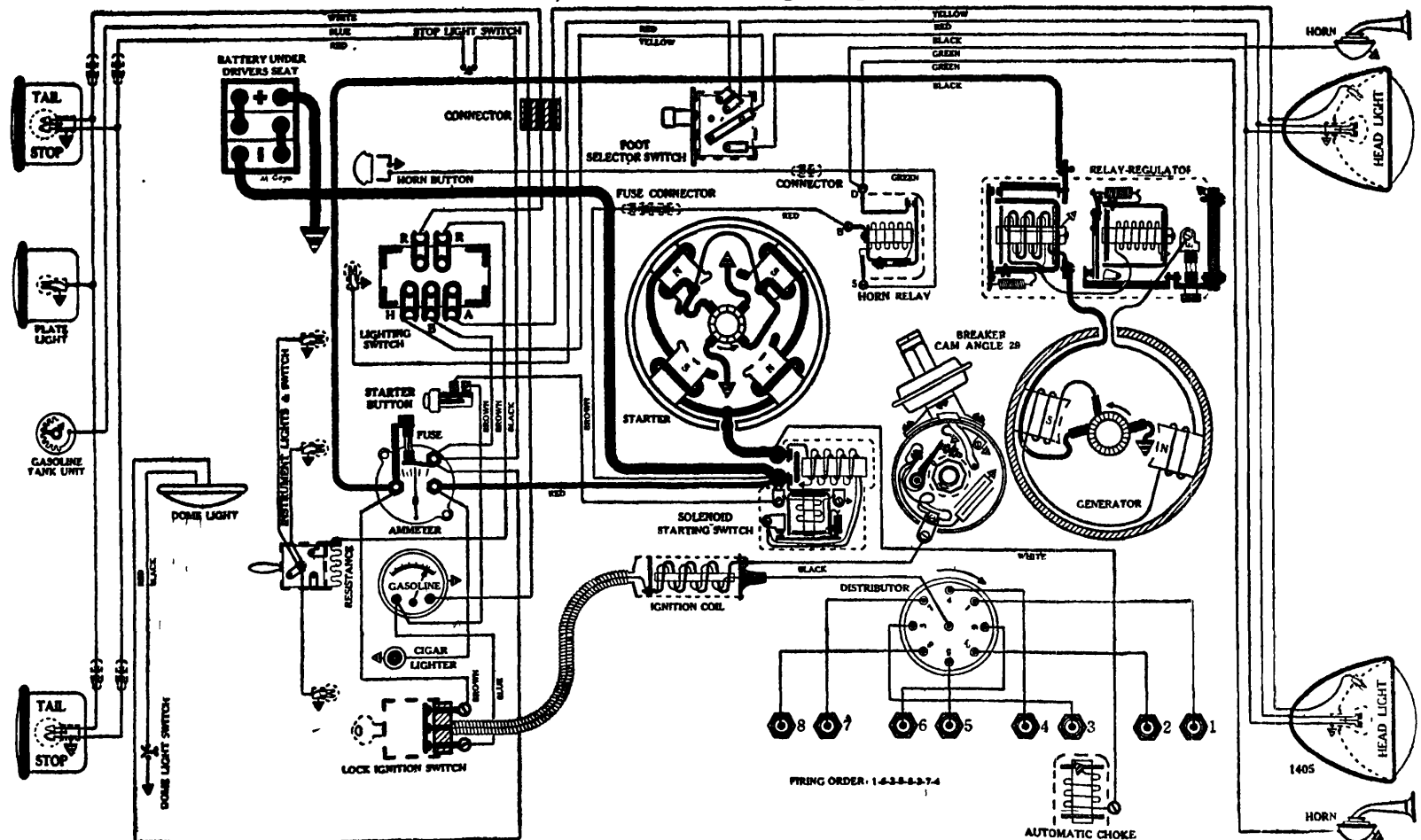
Foot Selector Switch—Clum No. 9657.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2331 (Bar Filament); PARK—55; INSTRUMENT—55; DOME—87; IGNITION SWITCH LIGHT—55; PLATE LIGHT—87; STOP AND TAIL—1158.

CHRYSLER

Engine { B re 3-1/4
Stroke 4-1/8

Mod 1 C-8, "Airstream" Straight Eight, (1936)

**BATTERY**

Willard, WH-2-15, 6 volts. Positive Terminal Grounded
For Data see page 1404 (6 cyl. 1936).

STARTER

A-L Test CU-430 Rotation, L. H., Com. End
Auto-Lite, MAX-4020

Connection to Engine—Mechanical pinion shift incorporating an over running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board, working in conjunction with a remote control relay (located in solenoid unit). One terminal of control relay is grounded thru its case.

Starter Pinion and Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5½ volts, 5300 R.P.M.

Cranking Engine—190 amps. at 5 volts.

Engine Cranking Speed—108 R.P.M.

Stall Data (on Car)—420 amps. at 3.1 volts.

Lock Torque (for test bench use)—16½ pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4106.

Armature—Auto-Lite, MAW-2030.

IGNITION

A-L Test 424 (IGT-4001-1) Rotation, R. H., Top View
A-L Test 479 (IGT-4001-D-1) Auto-Lite, IGT-4001-1 or IGT-4001-D-1
(Full Automatic Spark Advance in conjunction with Auto-Lite IGT-1023-AS Vacuum Advance Unit, which controls position of Breaker Plate)

Breaker—Contact separation .017 inch.

Cam Angles—Points closed 29 degrees; open 16 degrees (by actual tests).

Cam Angles—Points closed 27 degrees; open 18 degrees (official A-L data).

Contact Spring Tension—16 to 20 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "zero" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T D C) is directly under pointer on gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-9); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance Unit (Auto-Lite IGT-1023-AS; test No. 454, used on both distributors)—6 degrees (Dist. advance). Starts with vacuum of 5.1 inches mercury. Requires vacuum of 12 inches for full travel.

Automatic Advance—13 degrees (Distributor), both units.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
700	350	Start
800 (Intermediate)	400	3
1550	775	6
2300	1150	9
3300 (Max.)	1650	13

The following is the Spark Advance Table for the Auto-Lite IGT-4001-D-1 Distributor.

R.P.M.	Start
700	3
800 (Intermediate)	6
1700	9
2600	13
3800 (Max.)	13

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CE-4616; A-L, CE-4621 (convertible coupe and sedan).

Ign. Coil Only—A-L, CE-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-CFS; A-L, CE-1187-CWS (convertible coupe and sedan).

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4608-A-5

For Data see page 1404 (6 cyl. 1936).

RELAY-REGULATOR

Auto-Lite, TC-4301-A with TC-51G Resistance Unit
A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.5 to 7.3 volts.

Opens—0 to 3 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

Contact Spring Tension—10 to 12 oz.

Regulator—Points Open—8.25 volts (70° F.).

A-L Test 119 Points Close—7.0 volts.

For Regulator Adjustments at other temperatures see complete data in Technical Section.

Contact Opening—.005 inch (minimum).

Core Gap—.045 inch (contacts closed).

Solenoid Relay (Located in Solenoid Unit):

Closes—3.2 to 3.6 volts (max.).

Opens—2.0 volts or less.

Contact Gap—.025 to .030 inch.

Core Gap—.005 to .007 inch, contacts closed.

LIGHTING

Switch—Chrysler, No. 655559.

Location—Behind instrument board.

Fuses—(Lighting) Single 20 amp fuse (type 3A-20) in special bayonet type fuse holder, attached to back of ammeter. (If dual horns), 20 amp. (type 3A-20) in fuse connector on wire close to starting motor.

Horn Relay—Delco-Remy, 266-TK.

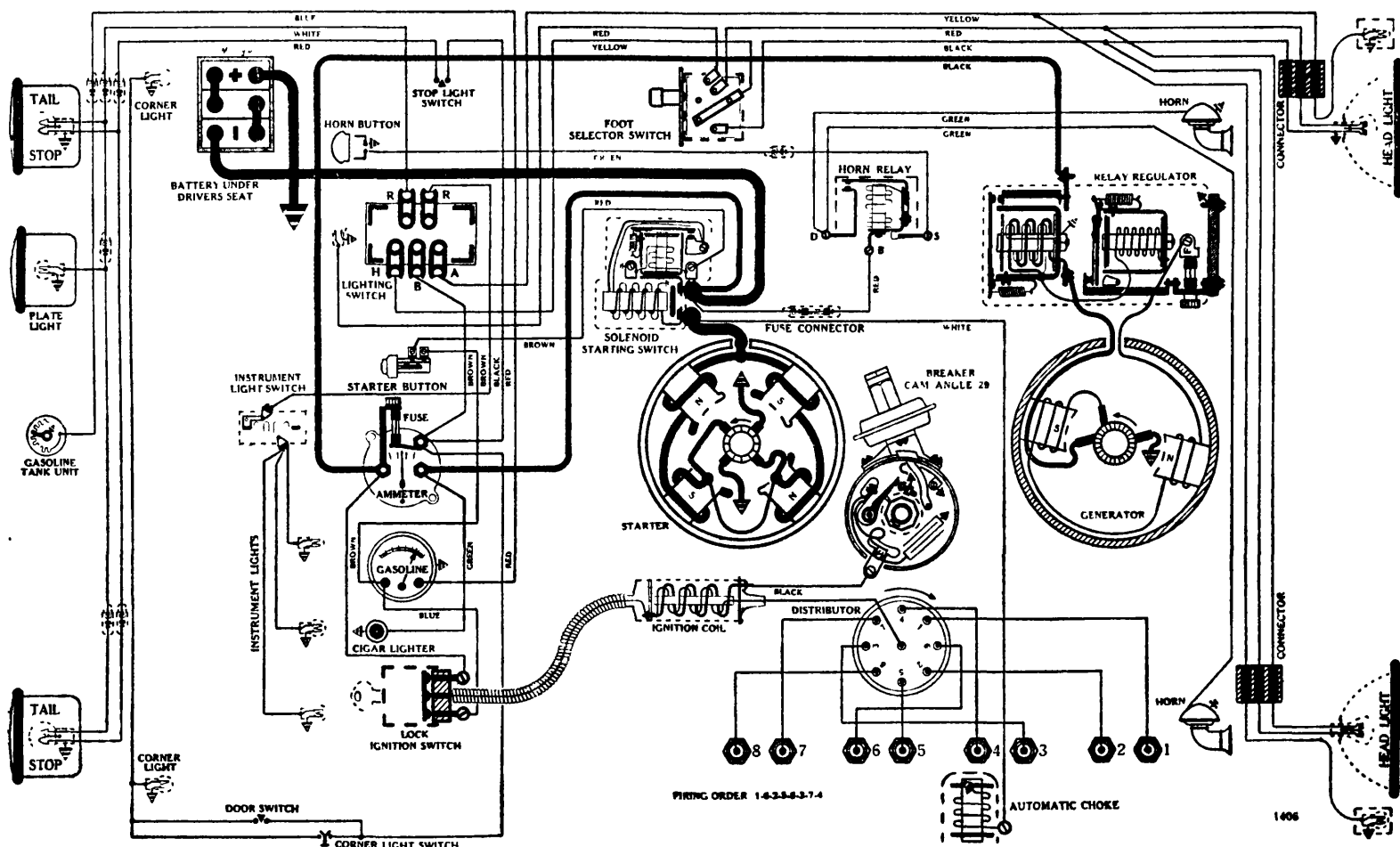
Foot Selector Switch—Clum No. 9657.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2331 (Bar Filament); PARK—55; INSTRUMENT—55; DOME—87; IGNITION SWITCH LIGHT—55; PLATE LIGHT—87; STOP AND TAIL—1158.

CHRYSLER

 Engin { Bor 3-1/4
 { Strok 4-7/8

Model C-9, "Airflow" Straight Eight, (1936)



BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded

Starting Capacity—160 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—5.4.

Lighting Capacity—6.8 amps. for 20 hours (136 amp. hour).

Box—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

A-L Test CU-430 Rotation, L. H., Com. End
Auto-Lite, MAX-4003

Connection to Engine—Mechanical pinion shift incorporating an overrunning clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board, working in conjunction with a remote control relay (located in solenoid unit). One terminal of control relay is grounded thru its case.

Starter Pinion and Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5½ volts, 5300 R.P.M.

Cranking Engine—140 amps. at 5.3 volts.

Engine Cranking Speed—120 R.P.M.

Stall Data (on Car)—420 amps. at 3.4 volts.

Lock Torque (for test bench use)—16½ pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—31 to 42 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4101.

Armature—Auto-Lite, MAW-2030.

IGNITION

A-L Test 418 (IGT-4001-C-1)

A-L Test 480 (IGT-4001-E-1)

Rotation, R. H., Top View

Auto-Lite, IGT-4001-C-1 or IGT-4001-E-1

(Full Automatic Spark Advance in conjunction with Auto-Lite IGT-1023-CS or IGT-1023-AS Vacuum Advance Unit, which controls position of Breaker Plate)

Breaker—Contact separation .017 inch.

Cam Angles—Points closed 29 degrees; open 16 degrees (by actual tests).

Cam Angles—Points closed 27 degrees; open 18 degrees (official A-L data).

Contact Spring Tension—16 to 20 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "zero" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) is directly under pointer on gear case cover. With rotor under No. 1 Dist. Cap. Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type S-9); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance Unit (Auto-Lite IGT-1023-CS; test No. 472, used with IGT-4001-C-1 Distributor)—5 degrees (Dist. advance). Starts with vacuum of 5.2 inches mercury. Requires vacuum of 14 inches for full travel.

Vacuum Advance Unit (Auto-Lite IGT-1023-AS; test No. 454, used with IGT-4001-E-1 Distributor)—6 degrees (Dist. advance). Starts with vacuum of 5.1 inches mercury. Requires vacuum of 12 inches for full travel.

Automatic Advance—11 degrees (Distributor), both units.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
700	350	Start
800 (Intermediate)	400	3
1700	850	6
2600	1300	9
3200 (Max.)	1600	11

The following is the Spark Advance Table for the Auto-Lite IGT-4001-E-1 Distributor.

700	350	Start
800 (Intermediate)	400	3
1890	945	6
2980	1490	9
3700 (Max.)	1850	11

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CE-4618.

Ign. Coil Only—A-L, CE-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-CQS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4608-B-5 (Belt Drive, Air Cooled)

For Data see page 1407 (Model C-10 and C-11, 1936).

RELAY—REGULATOR

Auto-Lite, TC-4301-A

For Data see page 1407 (Model C-10 and C-11, 1936).

LIGHTING

Switch—Chrysler, No. 655559.

Location—Behind instrument board.

Fuses—(Lighting) Single 20 amp. fuse (type 3A-20) in special bayonet type fuse holder, attached to back of ammeter. (If dual horns), 20 amp. (type 3A-20) in fuse connector on wire close to starting motor.

Horn Relay—Delco-Remy, 266-TK.

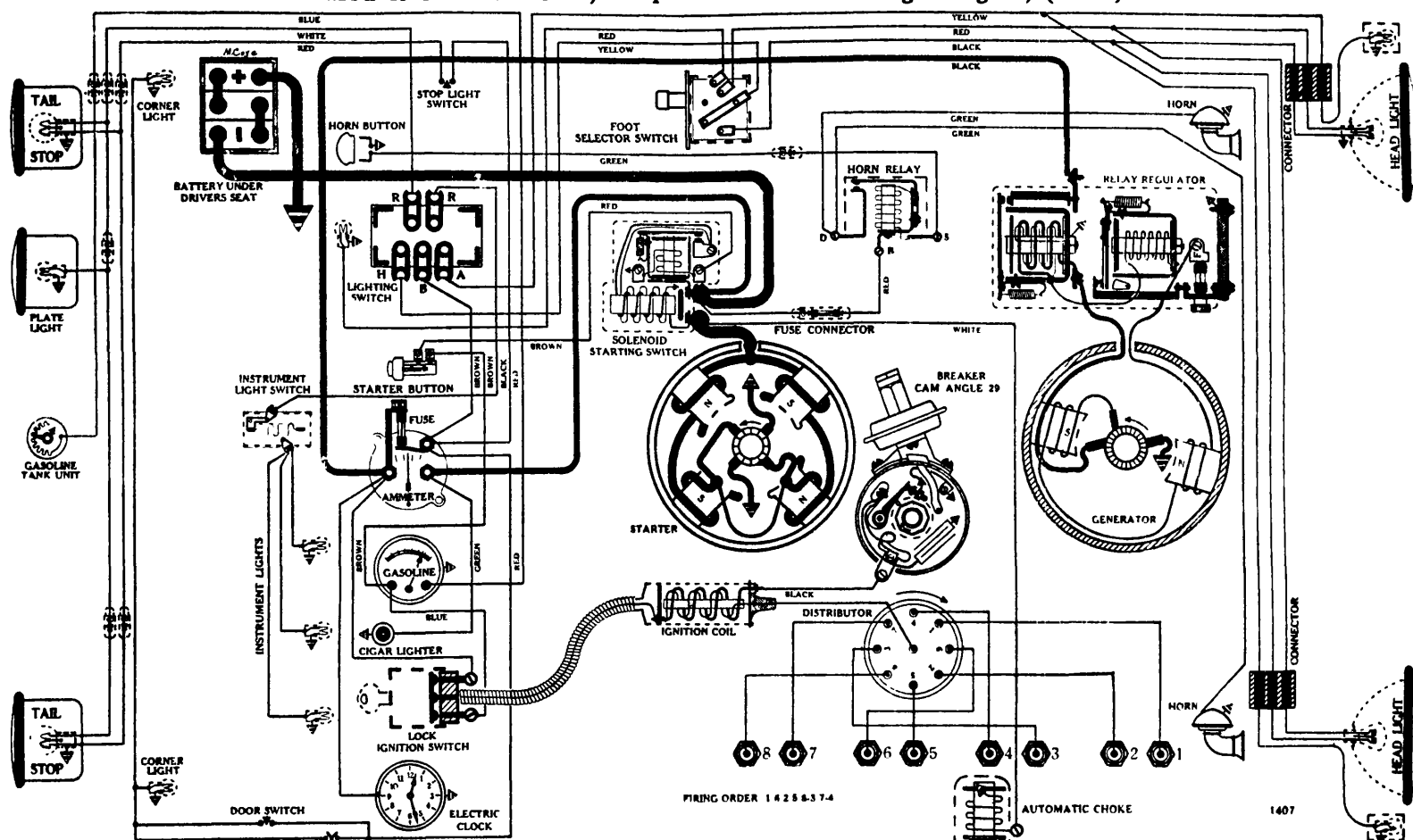
Foot Selector Switch—Clum No. 9657.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2331 (Bar Filament); PARK—55; INSTRUMENT—55; DOME—87; IGNITION SWITCH LIGHT—55; PLATE LIGHT—87; STOP AND TAIL—1158.

CHRYSLER

 Engin { Bore 3-1/4
 { Strok 4-7/8

Mod ls C-10 and C-11, "Imperial Airflow" Straight Eights, (1936)



BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded

Starting Capacity—160 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—5.4.

Lighting Capacity—6.8 amps. for 20 hours (136 amp. hour).

Box—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

A-L Test CU-430 Rotation, L. H., Com. End
Auto-Lite, MAX-4003

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board, working in conjunction with a remote control relay (located in solenoid unit). One terminal of control relay is grounded thru its case.

Starter Pinion and Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5½ volts, 5300 R.P.M.

Cranking Engine—120 amps. at 5.4 volts.

Engine Cranking Speed—132 R.P.M.

Stall Data (on Car)—390 amps. at 3.4 volts.

Lock Torque (for test bench use)—16½ pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—31 to 42 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4101.

Armature—Auto-Lite, MAW-2030.

IGNITION

A-L Test 418 (IGT-4001-C-1) Rotation, R. H., Top View
A-L Test 480 (IGT-4001-E-1) Auto-Lite, IGT-4001-C-1 or IGT-4001-E-1

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "zero" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) has moved 5 graduations past the pointer on gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

For all Distributor Data except Timing see page 1406 (Model C-9, 1936) Timing.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4608-B-5 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	12	1275	7.4
4	875	6.8	16	1600	7.8
8	1075	7.	21	2400 (Max.)	8.1

Motoring Freely—5 to 5½ amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5) in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116-F.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY—REGULATOR

Auto-Lite, TC-4301-A with TC-51G Resistance Unit

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.5 to 7.3 volts.

Opens—0 to 3 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

Regulator—Contact Spring Tension—10 to 12 oz.

A-L Test 119 Points Open—8.25 volts (70° F.).

Points Close—7.0 volts.

For Regulator Adjustments at other temperatures see complete data in Technical Section.

Contact Opening—.005 inch (minimum).

Core Gap—.045 inch (contacts closed).

Solenoid Relay (Located in Solenoid Unit):

Closes—3.2 to 3.6 volts (max.).

Opens—2.0 volts or less.

Contact Gap—.025 to .030 inch.

Core Gap—.005 to .007 inch, contacts closed.

LIGHTING

Switch—Chrysler, No. 655559.

Location—Behind instrument board.

Fuses—(Lighting) Single 20 amp. fuse (type 3A-20) in special bayonet type fuse holder, attached to back of ammeter. (If dual horns), 20 amp. (type 3A-20) in fuse connector on wire close to starting motor.

Horn Relay—Delco-Remy, 266-TK.

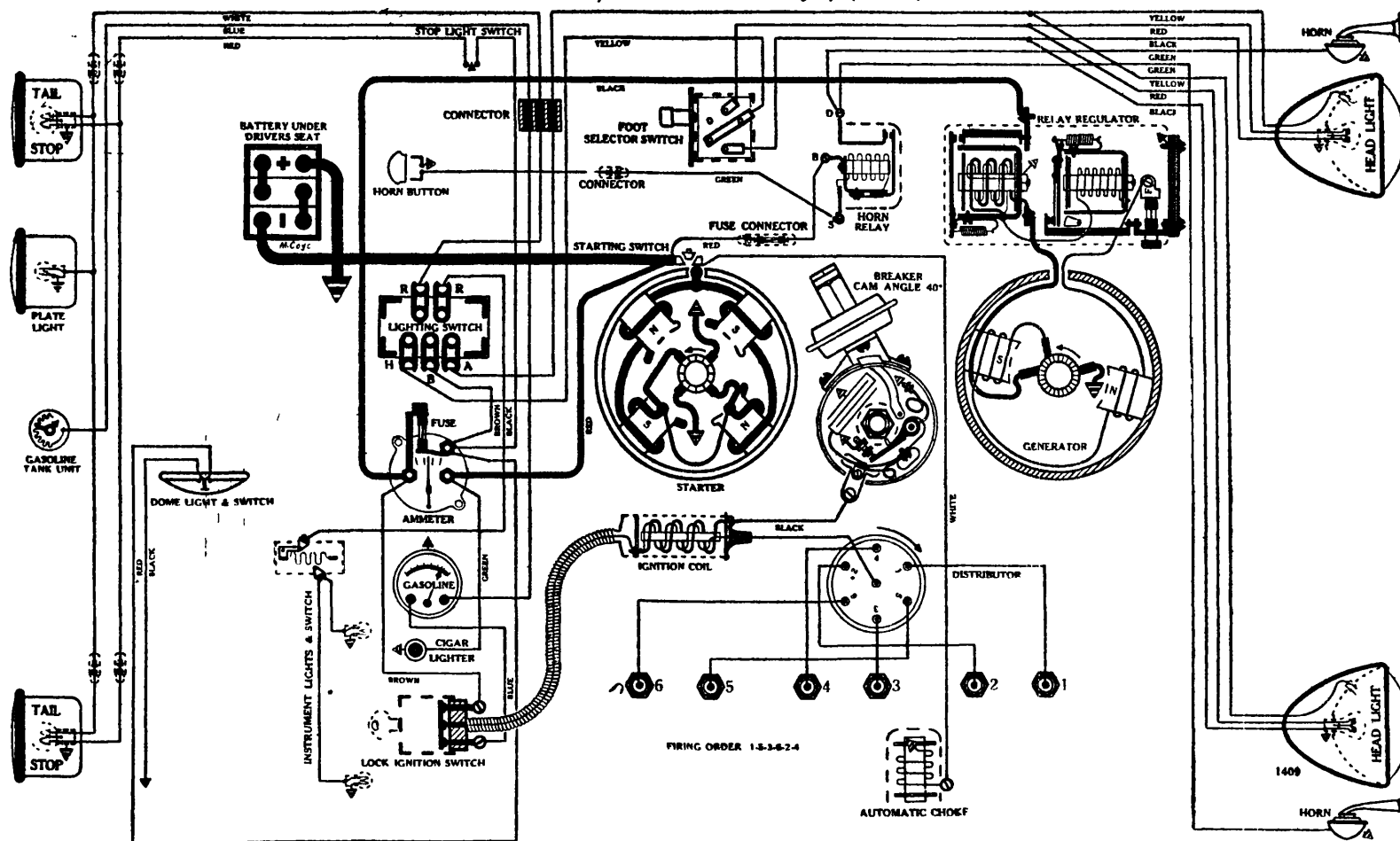
Foot Selector Switch—Clum No. 9657.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2331 (Bar Filament); PARK—55; INSTRUMENT—55; DOME—87; IGNITION SWITCH LIGHT—55; PLATE LIGHT—87; STOP AND TAIL—1158.

DE SOTO

Model S-1, "Airstream" 6 cyl., (1936)

Engin { Bor 3-3/8
Strok 4-1/2



BATTERY

Willard, WH-2-15, 6 volts. Positive Terminal Grounded
For Data see page 1410 (Model S-2, 1936).

STARTER

A-L Test CU-430 Rotation, L. H., Com. End
Auto-Lite, MAX-4015

Connection to Engine—Mechanical pinion shift incorporating an over running clutch. Initial movement of gear shifting lever causes pinion to engage with fly wheel. Further movement of lever closes switch on starting motor.
Starter Pinion and Clutch Assembly—Auto-Lite, MAD-3099.
Running Free—65 amps. at 5½ volts, 5300 R.P.M.
Cranking Engine—135 amps. at 5.1 volts.
Engine Cranking Speed—132 R.P.M.
Stall Data (on car)—400 amps. at 2.9 volts.
Lock Torque (for test bench use)—16½ pound-feet, 640 amps. at 3 volts.
Brush Spring Tension—31 to 42 oz. on each (new brushes).
Starting Switch—Auto-Lite, SW-2813.
Armature—Auto-Lite, MAW-2030.

IGNITION

A-L Test 419 (IGS-4006-1) Rotation, R. H., Top View
A-L Test 478 (IGS-4006-A-1) Auto-Lite IGS-4006-1 or IGS-4006-A-1

(Full Automatic Spark Advance in conjunction with Auto-Lite IGS-1023-AS Vacuum Advance Unit, which controls position of Breaker Plate)

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 40 degrees; open 20 degrees (by actual tests).
Cam Angles—Points closed 38 degrees; open 22 degrees (official A-L data).
Contact Spring Tension—16 to 20 oz.
Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "zero" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T D C) is directly under pointer on gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—14-MM (AC type K-9); Gap .025 inch.
Firing Order—1-5-3-6-2-4.

Vacuum Advance Unit (Auto-Lite IGS-1023-AS; test No. 453 used on both distributors)—8 degrees (Dist. advance). Starts with vacuum of 5.1 inches mercury. Requires vacuum of 15 inches for full travel.
Automatic Advance—12 degrees (Distributor), both units.
Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist.)

700	350	Start
800 (Intermediate)	400	3
1550	775	6
2300	1150	9
3060 (Max.)	1530	12

The following is the Spark Advance Table for the Auto-Lite IGS-4006-A-1 Distributor.

700	350	Start
800 (Intermediate)	400	3
1700	850	6
2600	1300	9
3500 (Max.)	1750	12

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4630; A-L, IG-4637 (convertible coupe and sedan).
Ign. Coil Only—A-L, IG-3224-S.
Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-CES; A-L, CE-1187-CUS (convertible coupe and sedan).

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GAR-4608-A-5

Performance Data Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	12	1275	7.4
4	875	6.8	16	1600	7.8
8	1075	7.0	21	2400 (Max.)	8.1

Motoring Freely—5 to 5½ amps. at 6 volts.
Max. Stall Current—26 to 28 amps. at 6 volts.
Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.
Field Fuse—5 amps. (type 1A 5) in regulator unit.
Brush Spring Tension—36 oz. Max. on each (new brushes).
Armature—Auto-Lite, GAR-2116-F.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY—REGULATOR

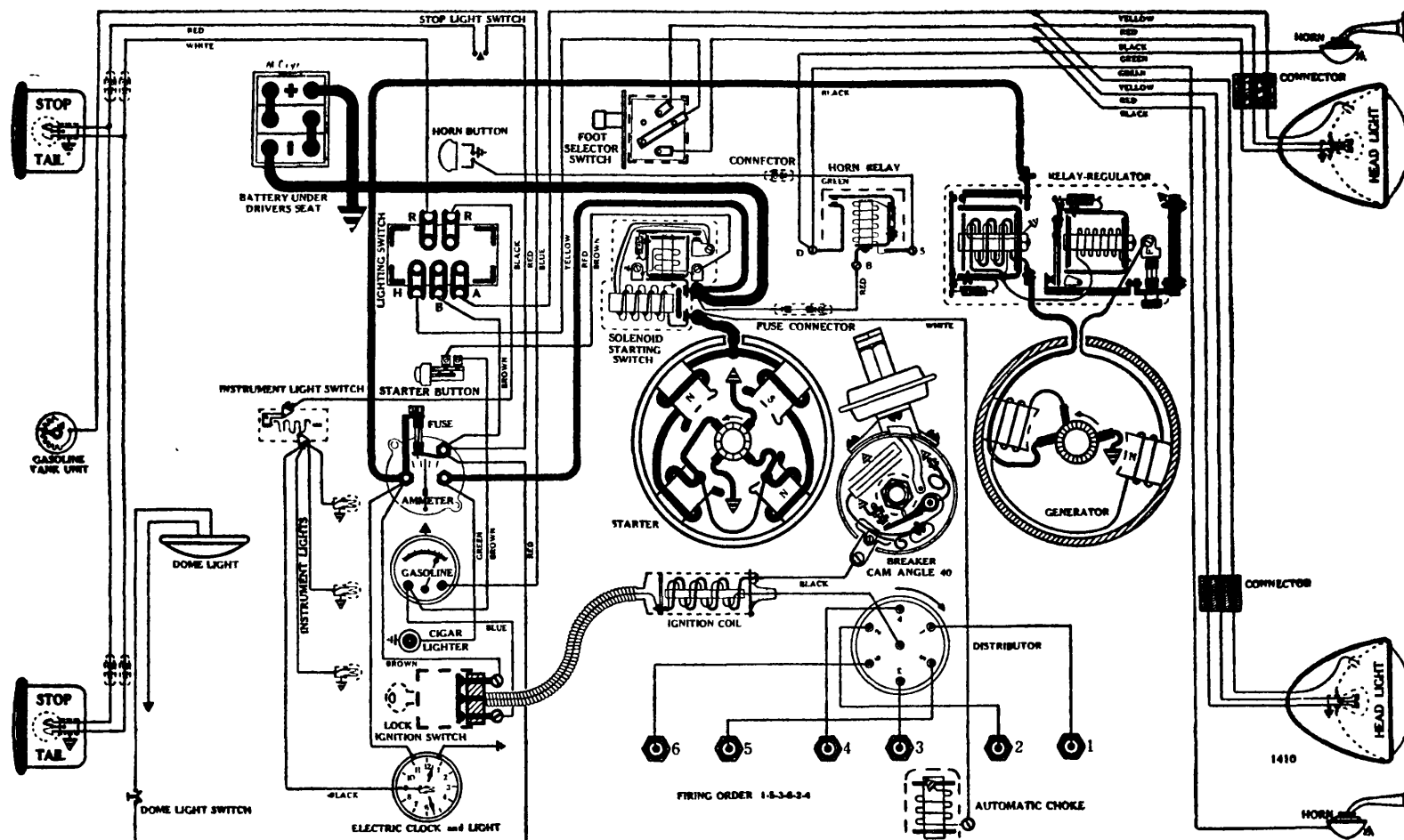
Auto-Lite, TC-4301-A
For Data see page 1410 (Model S-2, 1936).

LIGHTING

Switch—De Soto, No. 655559.
Location—Behind instrument board.
Fuses—(Lighting) Single 20 amp. fuse (type 3A-20) in special bayonet type fuse holder, attached to back of ammeter. (If dual horns), 20 amp. (type 3A-20) in fuse connector on wire close to starting motor.
Horn Relay—Delco-Remy, 266-TK.
Foot Selector Switch—Clum No. 9657.
Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2331 (Bar Filament); PARK—55; INSTRUMENT—55; DOME—87; IGNITION SWITCH LIGHT—55; PLATE LIGHT—87; CORNER—81; STOP AND TAIL—1158.

DE SOTO

Model S-2, "Airflow" 6 cyl., (1936)

Engin { B r 3-3/8
Strok 4-1/2

BATTERY

Willard, WH-2-15, 6 volts. Positive Terminal Grounded

Starting Capacity—140 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—4.3.

Lighting Capacity—5.9 amps. for 20 hours (119 amp. hour).

Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

RELAY-REGULATOR

Auto-Lite, TC-4301-A

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.5 to 7.3 volts.

Opens—0 to 3 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

Regulator—Contact Spring Tension—10 to 12 oz.

A-L Test 119 Points Open—8.25 volts (70° F.).

Points Close—7.0 volts.

For Regulator Adjustments at other temperatures see complete data in Technical Section.

Contact Opening—.005 inch (minimum).

Core Gap—.045 inch (contacts closed).

Solenoid Relay (Located in Solenoid Unit):

Closes—3.2 to 3.6 volts (max.).

Opens—2.0 volts or less.

Contact Gap—.025 to .030 inch.

Core Gap—.005 to .007 inch, contacts closed.

A-L Test 419 (IGS-4006-1)

IGNITION

A-L Test 478 (IGS-4006-A-1)

Rotation, R. H., Top View

Auto-Lite IGS-4006-1 or IGS-4006-A-1

(Full Automatic Spark Advance in conjunction with Auto-Lite IGS-1023-AS Vacuum Advance Unit, which controls position of Breaker Plate)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 40 degrees; open 20 degrees (by actual tests).

Cam Angles—Points closed 38 degrees; open 22 degrees (official A-L data).

Contact Spring Tension—16 to 20 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "zero" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) has moved 5 graduations past the pointer on gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-9); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance Unit (Auto-Lite IGS-1023-AS; test No. 453 used on both distributors)—8 degrees (Dist. advance). Starts with vacuum of 5.1 inches mercury. Requires vacuum of 15 inches for full travel.

Automatic Advance—12 degrees (Distributor), both units.

Eng. R.P.M.

Dist. R.P.M.

Degrees Advance (Dist.)

700

350

Start

800 (Intermediate)

400

3

1550

775

6

2300

1150

9

3060 (Max.)

1530

12

The following is the Spark Advance Table for the Auto-Lite IGS-4006-A-1 Distributor.

700

350

Start

800 (Intermediate)

400

3

1700

850

6

2600

1300

9

3500 (Max.)

1750

12

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4636.

Ign. Coil Only—A-L, IG-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-CPS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, TC-4301-A with TC-51G Resistance Unit

For Data see page 1409 (Model S-1, 1936).

STARTER

A-L Test CU-430

Rotation, L. H., Com. End

Auto-Lite, MAX-4016

Connection to Engine—Mechanical pinion shift incorporating an over running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board, working in conjunction with a remote control relay (located in solenoid unit). One terminal of control relay is grounded thru its case.

Starter Pinion and Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5½ volts, 5300 R.P.M.

Cranking Engine—135 amps. at 5.1 volts.

Engine Cranking Speed—132 R.P.M.

Stall Data (on Car)—400 amps. at 2.9 volts.

Lock Torque (for test bench use)—16½ pound-feet, 640 amps at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4104.

Armature—Auto-Lite, MAW-2030.

LIGHTING

Switch—De Soto, No. 655559.

Location—Behind instrument board.

Fuses—(Lighting) Single 20 amp. fuse (type 3A-20) in special bayonet type fuse holder, attached to back of ammeter. Horns, single 20 amp. fuse type 3A-20 in fuse connector on wire close to starter motor.

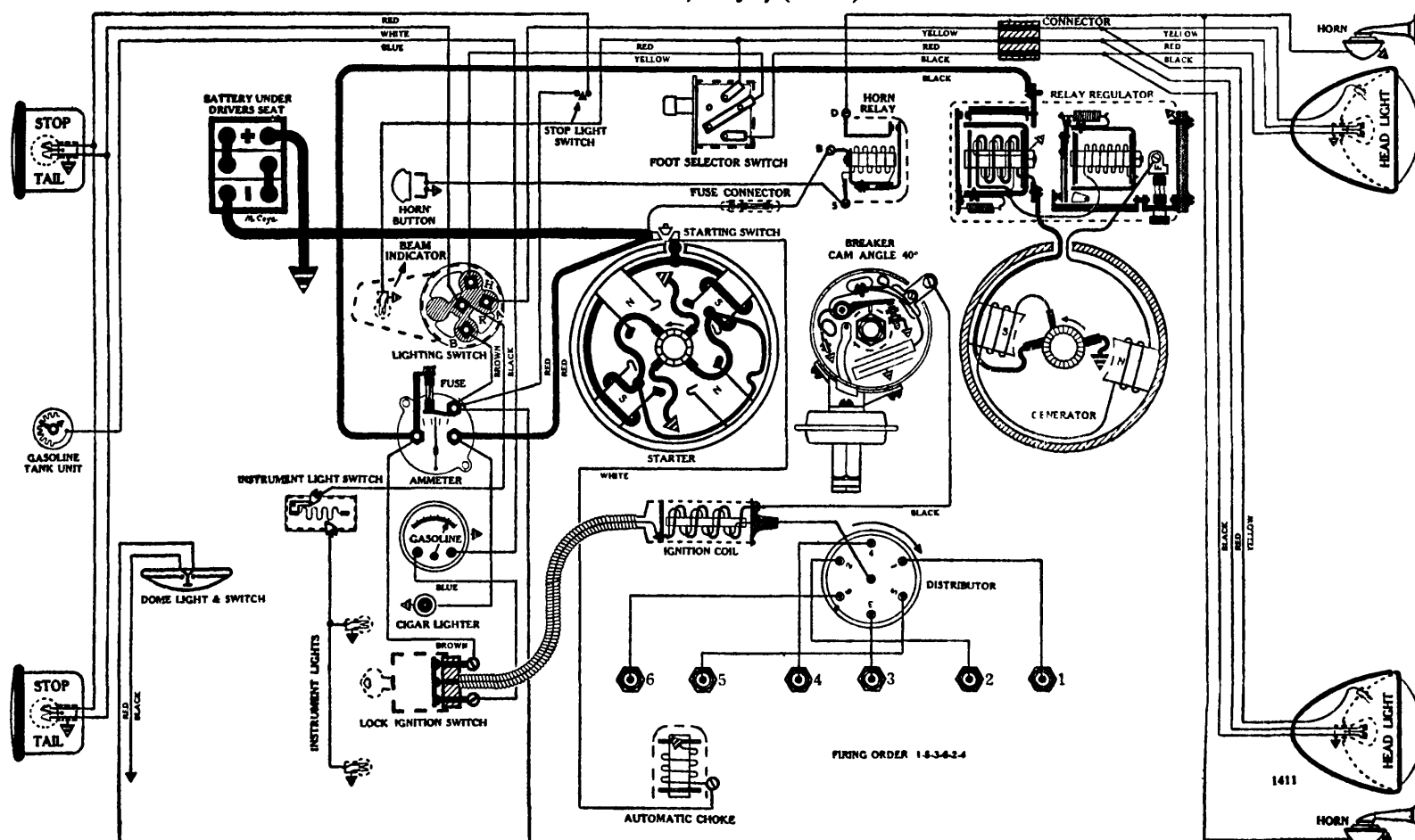
Horn Relay—Delco-Remy, 266-TK.

Foot Selector Switch—Clum No. 9857.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2331 (Bar Filament); PARK—55; INSTRUMENT—55; DOME—87; IGNITION SWITCH LIGHT—55; PLATE LIGHT—87; READING LIGHT—87; STOP AND TAIL—1158.

DODGE

Series D-2, 6 cyl., (1936)

Engine { Bore 3-1/4
Strok 4-3/8

BATTERY

Willard, WT-1-15, 6 volts. Positive Terminal Grounded
Starting Capacity—117 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1.
Lighting Capacity—4.5 amps. for 20 hours (90 amp. hour).
Box—Length, 9-1/16; width, 7-1/16; height, 8 7/8 inches.

STARTER

A-L Test CU-417 Rotation, L. H., Com. End
Auto-Lite, MAW-4010

Connection to Engine—Mechanical pinion shift incorporating an over running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5 1/2 volts, 4900 R.P.M.

Cranking Engine—160 amps. at 5.2 volts.

Engine Cranking Speed—132 R.P.M.

Stall Data (on car)—375 amps. at 3.3 volts.

Lock Torque (for test bench use)—11 1/2 pound-feet, 505 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-2813.

Armature—Auto-Lite, MAW-2030.

A-L Test 419 (IGS-4002-1)

A-L Test 478 (IGS-4002-A-1)

IGNITION

Rotation, R. H., Top View

Auto-Lite, IGS-4002-1 or IGS-4002-A-1

(Full Automatic Spark Advance in conjunction with Auto-Lite IGS-1023-S Vacuum Advance Unit, which controls position of Breaker Plate)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 40 degrees; open 20 degrees (by actual tests).

Cam Angles—Points closed 38 degrees; open 22 degrees (official A-L data).

Contact Spring Tension—16 to 20 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "zero" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) has moved 4 graduations past the pointer on gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-9); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance Unit (Auto-Lite IGS-1023-AS; test No. 453 used on both distributors)—8 degrees (Dist. advance). Starts with vacuum of 5.1 inches mercury. Requires vacuum of 15 inches for full travel.

Automatic Advance—12 degrees (Distributor), both units.

Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist.)

700	350	Start
800 (Intermediate)	400	3
1800	900	7
2300	1150	9
3060 (Max.)	1530	12

The following is the Spark Advance Table for the Auto-Lite

IGS-4002-A-1 Distributor.

700	350	Start
800 (Intermediate)	400	3
3500 (Max.)	1750	12

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4628.

Ign. Coil Only—A-L, IG-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-BWS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4608-5 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	12	1275	7.4
4	875	6.8	16	1600	7.8
8	1075	7.	21	2400 (Max.)	8.1

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.

Field Fuse—5 amp. (type 1A-5) in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116-F.

Third Brush Adjustment—Loosen cover band, shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4301-A with TC-51G Resistance Unit

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.5 to 7.3 volts.

Opens—0 to 3 amps. discharge.

Core Gap—.010 to .030 inch, contacts closed.

Contact Spring Tension—10 to 12 oz.

Regulator

A-L Test 119

Points Open—8.25 volts (70° F.).

Points Close—7.0 volts.

For Regulator Adjustments at other temperatures see complete data in Technical Section.

Contact Opening—.005 inch (minimum).

Core Gap—.045 inch (contacts closed).

LIGHTING

Switch—Douglas, No. 5432.

Location—Behind instrument board.

Fuses—(lighting) Single 20 amp. fuse (type 3A-20) in special bayonet type fuse holder, attached to back of ammeter. (If dual horns), 20 amp. (type 3A-20) in fuse connector on wire close to starting motor.

Horn Relay—Delco-Remy, 266-TK.

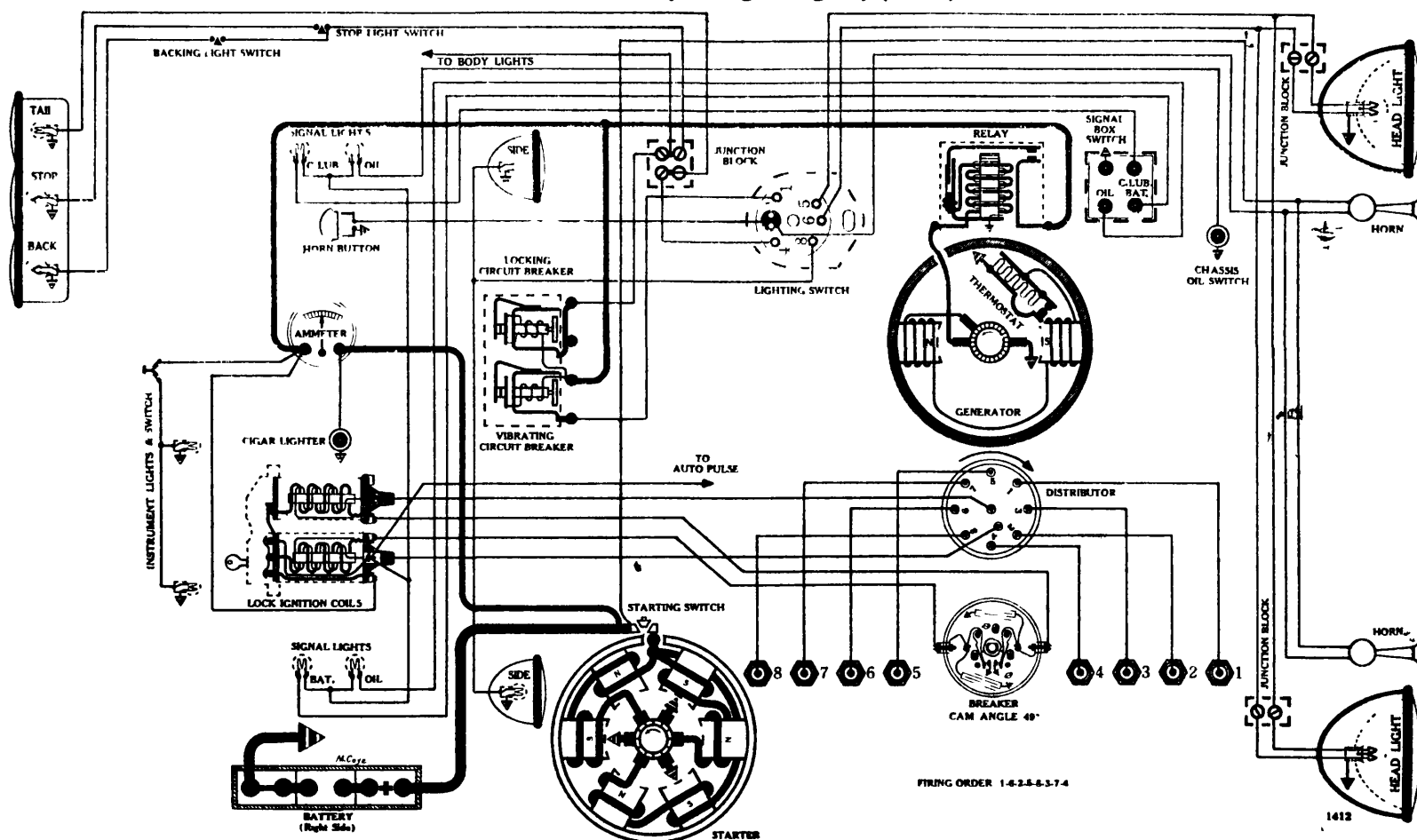
Foot Selector Switch—Clum No. 9657.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2381 (Bar Filament); PARK—55; INSTRUMENT—55; DOME—57; IGNITION SWITCH LIGHT—55; STOP AND TAIL—1153.

DUESENBERG

Mod ls J and SJ, Straight Eights, (1936)

Engin { Bor 3-3/4
Strok 4-3/4



BATTERY

Exide, XR-21-ER, 6 volts. Negative Terminal Grounded

Starting Capacity—175 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—5.8.
Lighting Capacity—7.3 amps. for 20 hours (147 amp. hour).
Box—Length, 20 1/4; width, 5-7/16; height, 8-11/16 inches.

STARTER

D-R Test 375-A Rotation, L. H., Com. End Group 12
Delco-Remy, 429

Connection to Engine—Bendix Drive, Type R11X-10.
Running Free—70 amps., 5 volts, 3000 R.P.M.

Lock Torque (for test bench use)—19 pound-feet, 500 amps. at 3 volts.

Brush Sprng Tension—36 to 40 oz. on each (new brushes).
Armature—Delco-Remy, 37895.

IGNITION

D-R Test 956 Rotation, R. H., Top View Group 19
Delco-Remy, 4094

Breakers—Contact separation .018 to .024 inch.
Contact Spring Tension—17 to 21 oz. on each.
Cam Angles—Points closed 49 degrees; open 41 degrees (each set of points separately).

Synchronizing—This unit uses a four lobe cam with two independent breakers and two coils. The movable set of breaker points must be accurately located to operate 45 degrees of distributor shaft travel corresponding to 90 degrees of flywheel travel, after the stationary set.

Timing—IMPORTANT! Synchronize distributor before timing it to engine. Time engine with manual spark control in full advanced position. Slowly turn engine until No. 8 piston is coming up on compression stroke. Stop when flywheel mark "Spark Adv." (found 1 1/2 inches or 12 degrees ahead of flywheel top dead center mark "1 & 8/CL") registers with line on flywheel housing. Loosen screw in center of distributor cam, attach rotor, turn cam and rotor until one end of rotor is under No. 8 Dist. Cap Terminal and stationary breaker points are just opening. Remove rotor and tighten screw in center of cam.

Spark Plugs—18-MM (Champion type C-7 or 6-M); Gap .022 to .028 inch.

Firing Order—1-6-2-5-8-3-7-4.

Manual Advance—10 degrees (Distributor).

Automatic Advance—21 degrees (Distributor).

Eng. R.P.M.

690
1040
1380
1720
2060
2400
2800 (Intermediate)
4000 (Max.)

Dist. R.P.M.

345
520
690
860
1030
1200
1400
2000

Degrees Advance (Dist.)

Start
3
6
9
12
15
18 1/2
21

Lock Ignition Coils—Delco-Remy, 553-B.

GENERATOR

D-R Test 328-A Rotation, L. H., Com. End Group 11
Delco-Remy, 428

Performance Data—Gen. cold. Thermostat closed.

Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	450	6.5	14	900	7.7
6	600	7.1	16	1000	8.1
11	800	7.9	20	1200 (Max.)	8.4

NOTE: Thermostat opens about 165° F., reducing charging rate approx. 30 to 40%.

Motoring Freely—4 to 4 1/2 amps. at 6 volts.

Max. Stall Current—22 amps. at 6 volts.

Field Test—3.2 to 4.1 amps. at 6 volts across field coils in series.

series.

Brush Spring Tension—20 to 28 oz. on each (new brushes).

Third Brush Adjustment—Remove cover band. Loosen lock screw on commutator end plate. Shift third brush counter clockwise to increase, or clockwise to decrease charging rate. Relock.

Generator Mounting—Cradle mounted on left side of engine. To remove disconnect drive coupling, loosen mounting clamp band.

Armature—Delco-Remy, 827753.

RELAY

D-R Test 606-A Delco-Remy, 265-R

Closes—6 1/2 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed

LIGHTING

Switch—Delco-Remy, 486-D.

Location—Foot of steering column. Lights controlled by lever on steering wheel.

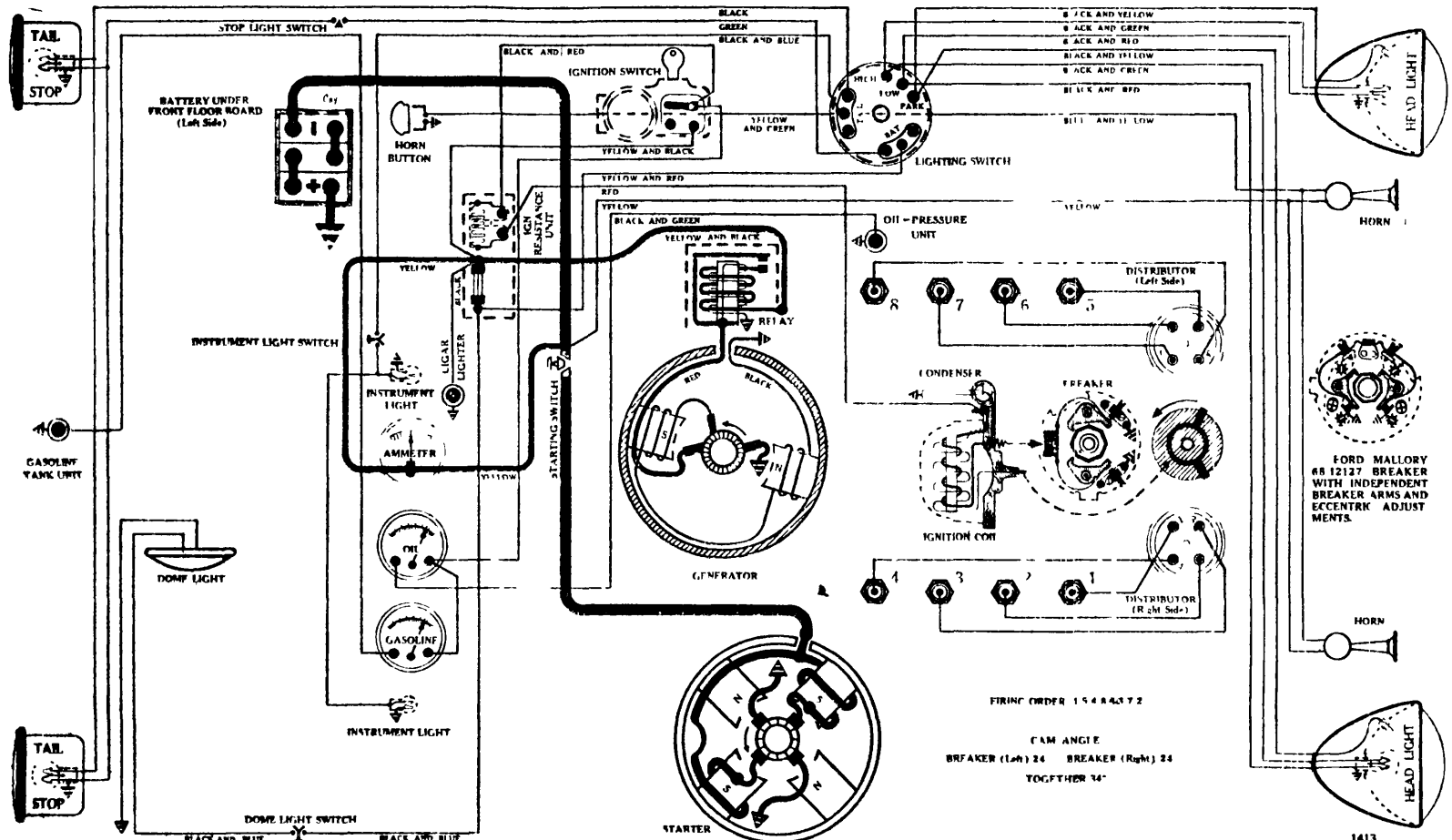
Circuit Breaker—Delco-Remy, 5759. Vibrating—Start 25 to 30 amps. Operates 10 to 15. Lock-Out—Starts 25 to 30 amps. Operates with discharge less than 1 ampere.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—1110; COWL—63; INSTRUMENT—63; DOME—64; STEP—63; SIGNALS—2B-G6110; STOP—1129; BACK—1129; TAIL—63.

FORD

Model 68, 90 D gree "Vee" 8, (1936)

Engin { Bore 3-1/16
Stroke 3-3/4



BATTERY

Ford, 40-10655-C, 6 volts. Positive Terminal Grounded
Starting Capacity—120 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.5.
Lighting Capacity—4.8 amps. for 20 hours (96 amp. hour).
Box—Length, 10-9/16; width, 7 1/4; height, 7 1/4 inches.

STARTER

Rotation, L. H., Com. End
Ford, Type 18-11002

Connection to Engine—Bendix Drive, Type L11FX-10.
Running Free—35 to 40 amps. at 6 volts, 3960 R.P.M.
Cranking Engine—95 to 105 amps. at 5.1 volts.
Engine Cranking Speed—120 R.P.M.
Stall Data (on car)—320 amps. at 3.9 volts.
Lock Torque (for test bench use)—12 pound-feet, 500 amps. at 3 volts.
Brush Spring Tension—32 to 36 oz. on each (new brushes).
Starting Switch—Ford, 18-11450.
Armature—Ford, 18-11005.

IGNITION

Rotation, L. H., Viewed from Front
Ford-Mallory, Types 40-12127-B or 68-12127
(Full Automatic Spark Advance in conjunction with Vacuum Operated Governor Brake)

Breakers—Type 40-12127-B; Contact separation—.012 to .014 inch on each.
Type 68-12127; Contact separation—.014 to .016 inch on each.

Cam Angles—NOTE: Both distributors are designed that they have the same cam angles even though the breaker point gaps on the two units are different. Points closed 24 degrees, open 21 degrees (left breaker). Points closed 34 degrees, open 11 degrees (right breaker). Points closed 34 degrees, open 11 degrees (both operating).

Contact Spring Tension—22 to 27 oz. on each (both units).
Timing—Construction of ignition drive assembly makes it impossible to attach unit to engine other than in correct position. Provision is made for a slight variation in spark timing by moving small 2/16 inch slotted cap screw (found on right side of ignition housing between mounting flange and right distributor cap) up, to increase spark advance, and down to retard. With screw in center of slot engine will have an initial spark advance of 4 flywheel degrees which, theoretically, is the correct timing position.

Spark Plugs—18-MM (Champion type 7); Gap .025 inch.

Firing Order—1-5-4-8-6-3-7-2.

Automatic Advance—8 degrees (Distributor), both units.
Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist.)
(Test both units with governor free; vacuum brake released)
The following is the Spark Advance Table for the 40-12127-B Distributor.

400	200	Start
650	325	2
1180	590	4
1630	815	5
2100	1050	6
3000 (Max.)	1500	8

The following is the Spark Advance Table for the 68-12127 Distributor.

400	200	Start
600	300	2
1170	585	4
1220	610	5
1440	720	6
1900 (Max.)	950	8

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301310.

GENERATOR

Rotation, L. H., Com. End
Ford, Type 40-100000-B (Belt Drive, Air Cooled)

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.7	9	1100	7.5
3	800	6.9	11	1200	7.6
5	900	7.3	13	1500	7.9
7	1000	7.4	15	1700 (Max.)	8.1

Motoring Freely—6 amps. at 6 volts.
Max. Stall Current—25 amps. at 5 volts.
Field Test—5 1/4 amps. at 6 volts across field coils in series.
Brush Spring Tension—24 to 28 oz. on main; 20 to 24 oz. on third.
Armature—Ford, 18-10005-A.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Ford, Type B-10505-A

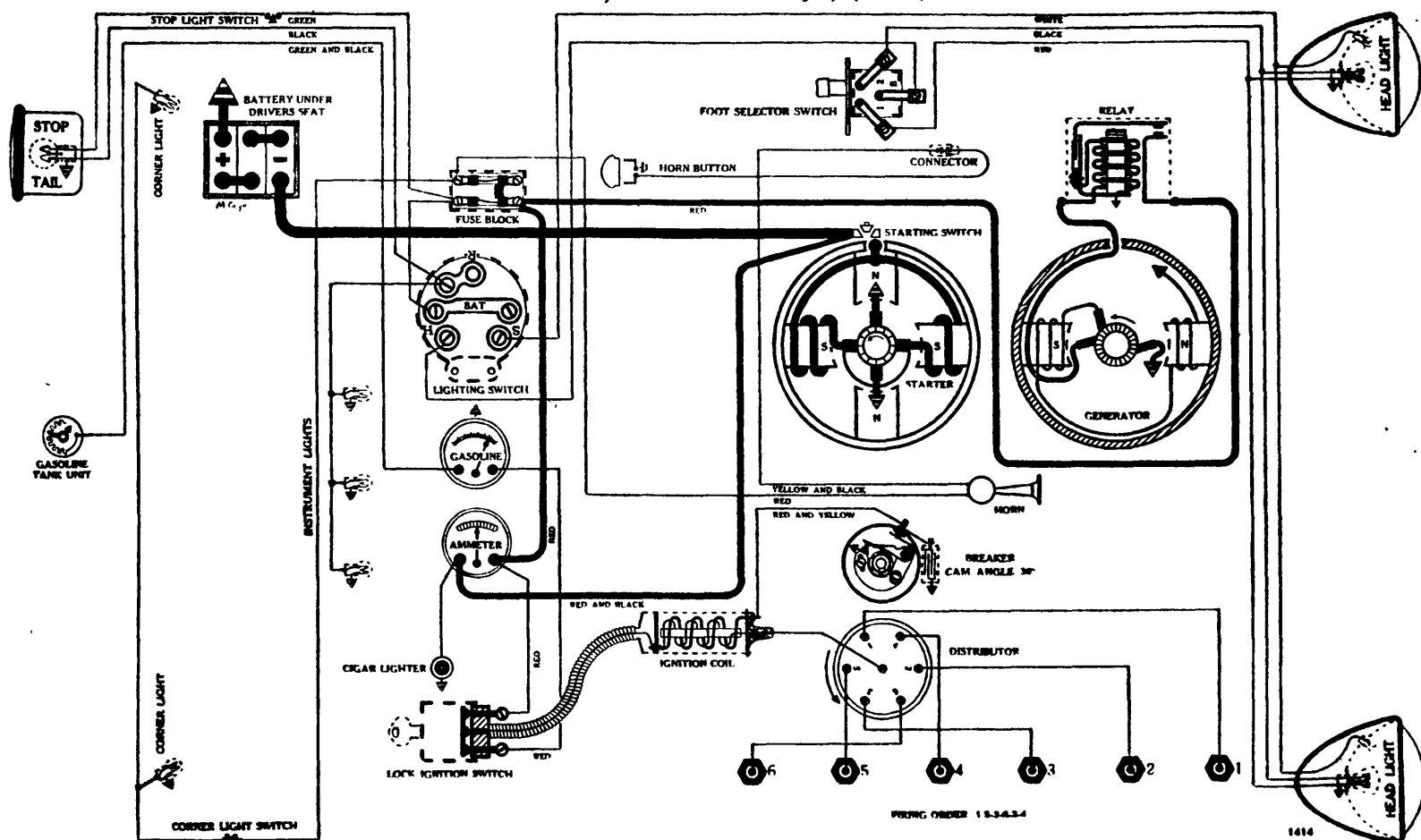
Closes—6 1/2 to 7 volts.
Opens—0 to 2 1/2 amps. discharge.
Contact Gap—.015 to .020 inch.
Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Ford, Type 48-11653.
Location—Foot of steering column. Lights controlled by lever on steering wheel. Wires soldered to terminals.
Fuses—Single 20 amp. fuse (type 3A-20), mounted on dash, behind instrument board.
Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2330; PARK—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

GRAHAM

Series 80, "Crusader" 6 cyl., (1936).

Engine {Bor 3
Strok 4

BATTERY

Willard, WHT-1-90, 6 volts. Positive Terminal Grounded

Starting Capacity—114 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—3.
 Lighting Capacity—4.5 amps. for 20 hours (90 amp. hour).
 Box—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

D-R Test 368 (both units) Rotation, L. H., Com. End Group 46
 Delco-Remy, 738-J or 738-V

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—100 amps. at 5.3 volts.

Engine Cranking Speed—132 R.P.M.

Stall Data (on Car)—350 amps. at 3.8 volts.

Lock Torque (for test bench use)—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test 105 Rotation, L. H., Top View Group 82
 Delco-Remy, 623-A

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-N, 681-C or 681-G Vacuum Controls, which move the entire Distributor)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 36 degrees; open 24 degrees.

Contact Spring Tension—17 to 21 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "Ign" (found 2 degrees, or approximately 3/16 inch, ahead of flywheel mark "1-DC") registers with the pointer at the timing hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type 7); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance Units (Delco-Remy 680-N, used on first 3000 cars; superseded by 681-C; test No. 669 for both)—5 to 6 degrees (Dist. advance). Starts with vacuum of 7 inches mercury. Requires vacuum of from 9 to 13 inches for full travel. Latter superseded by Delco-Remy 681-G; test No. 657—5 degrees (Dist. advance). Starts with vacuum of from 5 to 7 inches mercury. Requires vacuum of from 14 to 18 inches for full travel.

Automatic Advance—9 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
550	275	Start
1050	525	2
1550	775	4
2050	1025	6
2550	1275	8
2800 (Max.)	1400	9

Ignition Coil—Delco-Remy, 536-J.

Ignition Switch and Cable—Delco-Remy, 431-U.

GENERATOR

D-R Test 278-A Rotation, L. H., Com. End Group 51
 Delco-Remy, 937-Y (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	10	1020	7.5
2	760	6.7	14	1270	7.9
6	860	7.1	18	2000 (Max.)	8.3

Motoring Freely—3½ to 4 amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 6 volts.

Field Test—3½ amps. at 6 volts across field coils in series.

Brush Spring Tension—23 to 27 oz. on each (new brushes).

Armature—Delco-Remy, 1859794.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAY

Delco-Remy, 265-B

Closes—6¼ to 7½ volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 481-Y.

Location—Behind instrument board (left side).

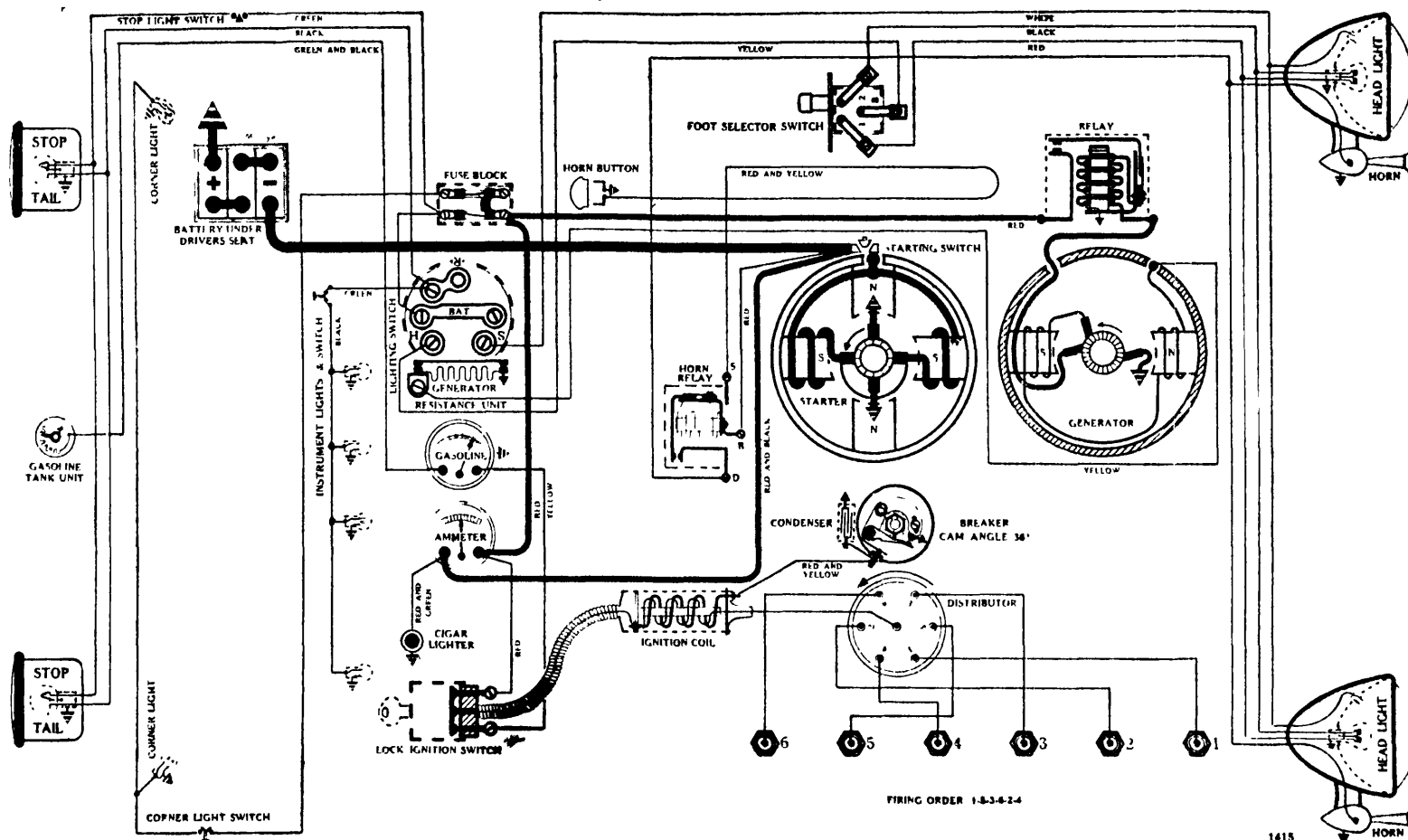
Fuses—Two 20 amp. fuses (type 3A-20) in fuse block on dash (driver's side).

Foot Selector Switch—Delco-Remy, 471-P.

Lamps—Refer to "Lamp Data" in technical section. HEAD—2331 (Bar Filament); PARK—55; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158. Note:—If separate bulbs, stop—87; tail—63.

Engin { Bor 3-1/4
 } Strok 4-3/8

Series 90, "Cavalier" 6 cyl., (1936)



Willard, WHT-1-90, 6 volts. Positive Terminal Grounded
For Data see page 1416 (Series 110, 1936)

D-R Test 368 Rotation, L. H., Com. End Group 46
Delco-Remy, 738-T

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—90 amps. at 5.3 volts.

Engine Cranking Speed—120 R.P.M.

Stall Data (on Car)—380 amps. at 3.7 volts.

Lock Torque (for test bench use)—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

D-R Test 105 Rotation, L. H., Top View Groop 82
Delco-Remy, 623-A

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-N, 681-C, or 681-G Vacuum Controls, which move the entire Distributor)

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 36 degrees; open 24 degrees.
Contact Spring Tension—17 to 21 oz.
Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "Ign" (found 2 degrees, or approximately 3/16 inch ahead of flywheel mark "1-10C") registers with the pointer at the timing hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—14-MM (Champion type J-9); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Vacuum Advance Units (Delco-Remy 680-N, used in first 3000 cars; superseded by 681-C; test No. 689 for both)—5 to 6 degrees (Dist. advance) Starts with vacuum of 7 inches mercury. Requires vacuum of from 2 to 13 inches for full travel. **Later superseded by Delco-Remy 681-G; test No. 657**—5 degrees (Dist. advance) Starts with vacuum of from 5 to 7 inches mercury. Requires vacuum of from 14 to 18 inches for full travel.
Automatic Advance—9 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
550	275	Start
1050	525	2
1550	775	4
2050	1025	6
2550	1275	8
2800 (Max.)	1400	9

Ignition Coil—Delco-Remy, 536-J.
Ignition Switch and Cable—Delco-Remy, 431-U.

D-R Test 1250 **Rotation, L. H., Top View** **Group 48**
Delco-Remy, 948-B

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	12	1250	7.5
4	875	6.9	16	1600	7.9
8	1000	7.2	20	2400 (Max.)	8.2

Brush Spring Tension—Main brushes 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Delco-Remy, 265-H
For Data see page 1416 (Series 110, 1936)

Switch—Delco-Remy, 481-Z (with generator field resistance).
NOTE: This switch is so designed that by pulling knob one position, the field resistance is shorted out, resulting in maximum charging, with no lights burning.

Location—Behind instrument board (left side).

Fuses—Two 20 amp. fuses (type 3A-20) in fuse block on dash (driver's side).

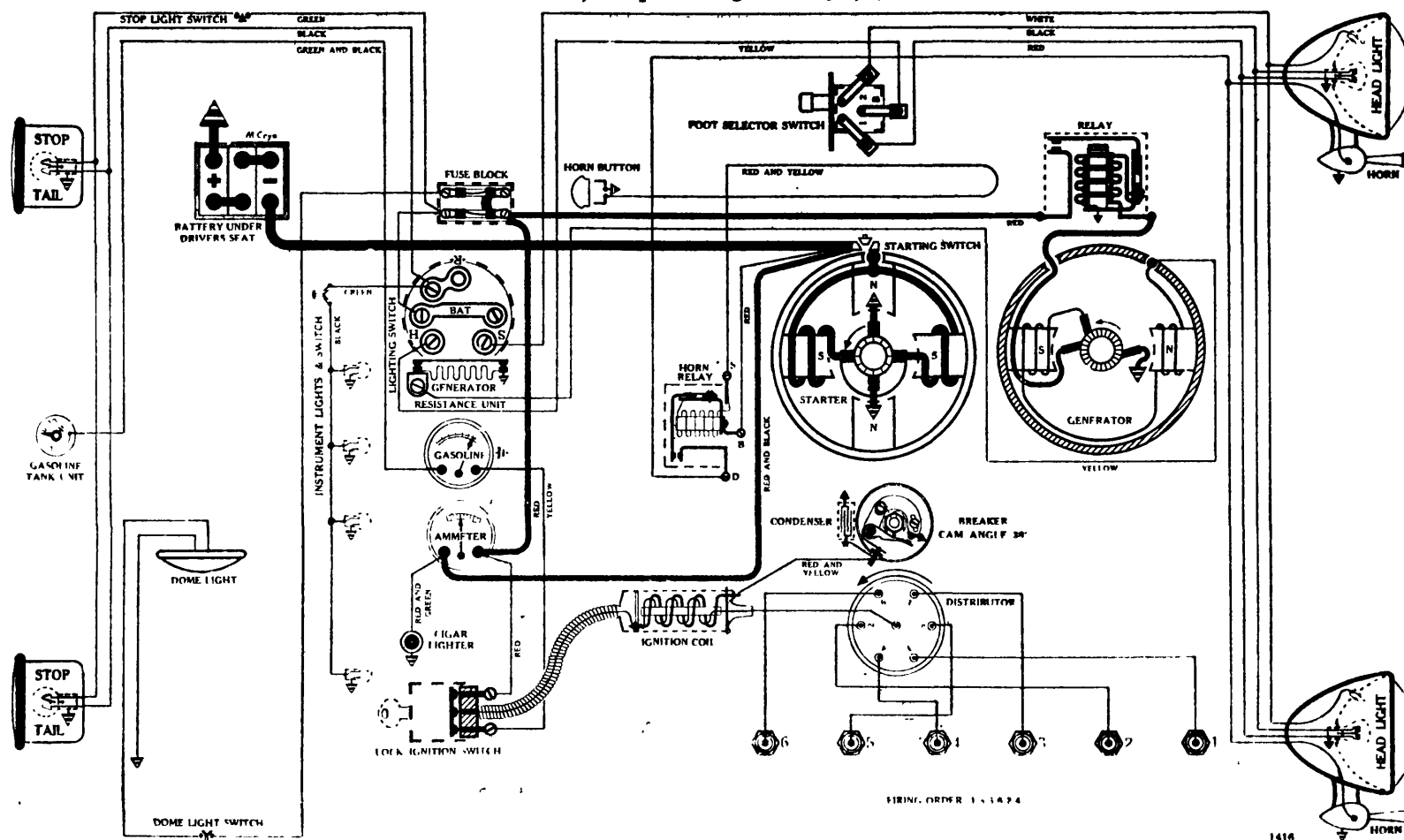
Horn Relay—Delco-Remy, 266-TK.

Foot Selector Switch—Delco-Remy, 471-P.

Lamps—Refer to "Lamp Data" in technical section HEAD—2331 (Bar Filament); PARK—55; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158. Note:—If separate bulbs, stop—87; tail—63.

GRAHAM

Series 110, "Supercharger" 6 cyl., (1936)

 Engin { Bore 3-1/4
Str ke 4-3/8


BATTERY

Willard, WHT-1-90, 6 volts. Positive Terminal Grounded

Starting Capacity—114 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.
Lighting Capacity—4.5 amps. for 20 hours (90 amp. hour).
Box—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

D-R Test 368 Rotation, L. H., Com. End Group 46
Delco-Remy, 738-T

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—120 amps. at 5.5 volts.

Engine Cranking Speed—168 R.P.M.

Stall Data (on Car)—370 amps. at 4.1 volts.

Lock Torque (for test bench use)—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test 125 Rotation, L. H., Top View Group 82
Delco-Remy, 623-E

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-N, 681-C, or 681-G Vacuum Controls, which move the entire Distributor)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 36 degrees; open 24 degrees

Contact Spring Tension—17 to 21 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "1-DC" registers with the pointer at the timing hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type 7); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance Units (Delco-Remy 680-N, used on first 3000 cars; superseded by 681-C; test No. 689 for both)—5 to 6 degrees (Dist. advance). Starts with vacuum of 7 inches mercury. Requires vacuum of from 9 to 13 inches for full travel. Latter superseded by Delco-Remy 681-G; test No. 687—5 degrees (Dist. advance). Starts with vacuum of from 5 to 7 inches mercury. Requires vacuum of from 14 to 18 inches for full travel.

Automatic Advance—6 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
330	165	Start
600	300	1
880	440	2
1160	580	3
1450	725	4
1730	865	5
2000 (Max.)	1000	6

Ignition Coil—Delco-Remy, 539-M.

Ignition Switch and Cable—Delco-Remy, 431-U.

GENERATOR

D-R Test 1250 Rotation, L. H., Com. End Group 48

Delco-Remy, 948-B

For Data see page 1415 (Series 90, 1936)

RELAY

Delco-Remy, 265-H

Closes—6 3/4 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 481-Z (with generator field resistance).

NOTE: This switch is so designed that by pulling knob one position, the field resistance is shorted out, resulting in maximum charging, with no lights burning.

Location—Behind instrument board (left side).

Fuses—Two 20 amp. fuses (type 3A-20) in fuse block on dash (driver's side).

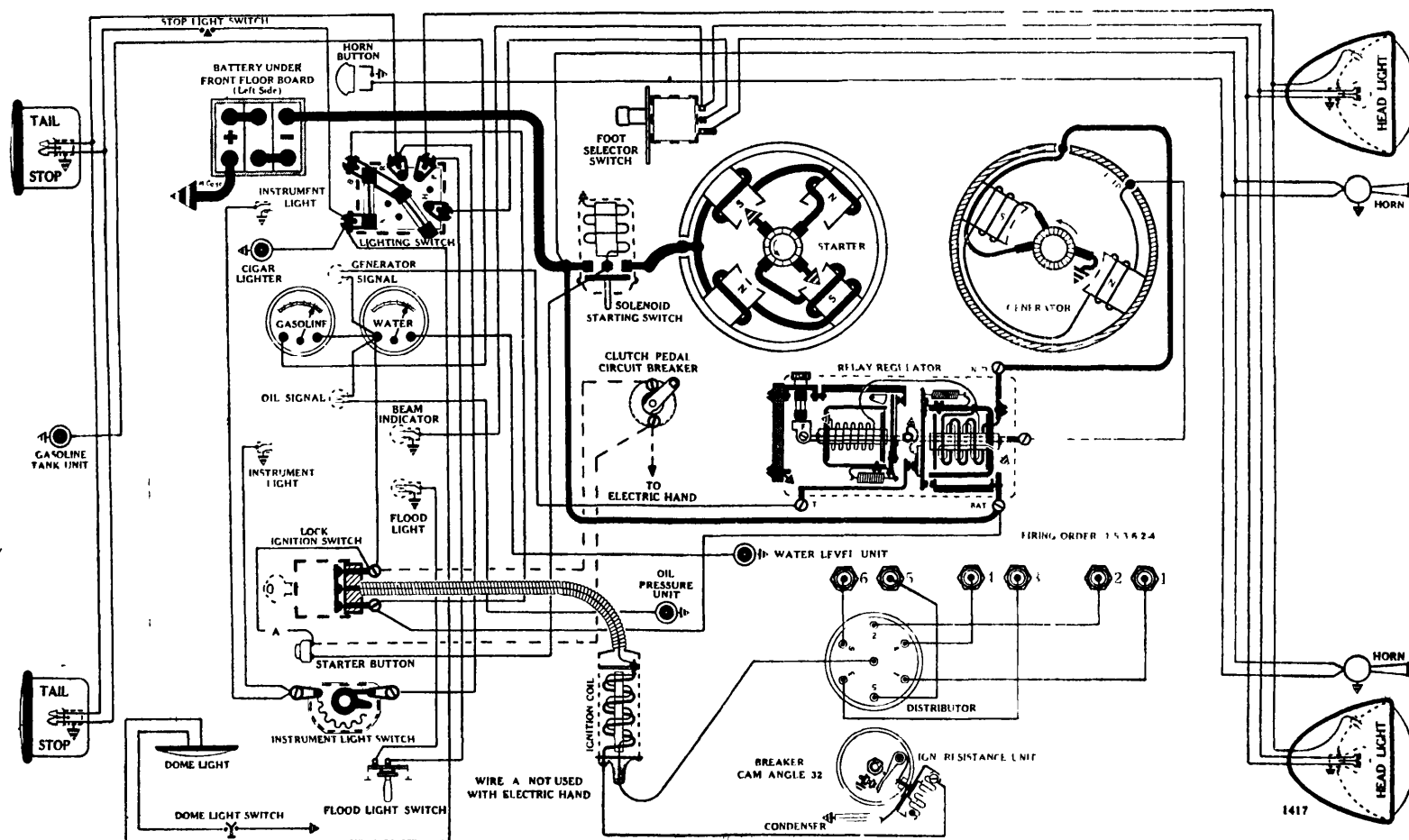
Horn Relay—Delco-Remy, 266-TK.

Foot Selector Switch—Delco-Remy, 471-P.

Lamps—Refer to "Lamp Data" in technical section. HEAD—2331 (Bar Filament); PARK—55; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158. Note:—If separate bulbs, stop—87; tail—63.

HUDSON

Mod 1 63, 6 cyl., (1936)

 Engin { Bor 3
Stroke 5


BATTERY

National, ST3-17X, 6 volts. Positive Terminal Grounded
 Starting Capacity—120 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—3.2.
 Lighting Capacity—4.9 amps. for 20 hours (98 amp. hour).
 Box—Length, 10-9/16; width, 7-1/4; height, 7-15/16 inches.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End
 Auto-Lite, MAB-4075

Connection to Engine—Bendix Drive, Type A-1673.
 Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.
 Cranking Engine—120 amps. at 5.55 volts.
 Engine Cranking Speed—144 R.P.M.
 Stall Data (on Car)—440 amps. at 4.3 volts.
 Lock Torque (for test bench use)—15 1/2 pound-feet, 582 amps. at 3 volts.
 Brush Spring Tension—44 to 56 oz. on each (new brushes).
 Solenoid Starting Switch—Auto-Lite, SS-4001.
 Push Button Starting Control Switch—Soreng-Manegold, A-5550-A.
 Armature—Auto-Lite, MAB-2113.

IGNITION

A-L Test 447 Rotation, R. H., Top View
 Auto-Lite, IGB-4301-B
 (Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
 Cam Angles—Points closed 32 degrees; open 28 degrees (by actual tests).
 Cam Angles—Points closed 40 degrees; open 20 degrees (official A-L data).
 Contact Spring Tension—16 to 20 oz.
 Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "U D C 1 6" registers with pointer cast in flywheel inspection hole. With rotor under No. 1 Dist Cap Terminal, breaker points should just open.
 Spark Plug—14 MM (Champion type J 8 A, used with standard compression engines. Champion type H 10 used with engines having compression ratio of 7 to 1). Gap .025 inch.
 Firing Order—1-5-3-6-2-4.
 Automatic Advance—14 degrees (Distributor).
 (IMPORTANT NOTE Official Auto-Lite advance characteristics for this distributor have been changed since 1935. The following is the latest information available, and checks with distributors tested.)

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
800 (Intermediate)	400	3
1656	828	7
2300	1150	10
3160 (Max.)	1580	14

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4633.
 Ign. Coil Only—A-L, IG-3224-S
 Ign. Switch and Cable Assembly Less Lock—A-L, CE-2233-BS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4701-6 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.6	12	1150	7.5
2	750	6.7	16	1400	7.9
4	850	6.9	20	1700	8.2
6	875	7.	21 1/2	2000	8.3
8	950	7.1	22	2200 (Max.)	8.4

Running Free—5 to 5 1/2 amps. at 6 volts.
 Max. Stall Current—32 amps. at 4 1/2 volts.
 Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.
 Field Fuse—5 amps. (type 1A-5), in regulator unit.
 Brush Spring Tension—22 oz. Max. on each (new brushes).
 Armature—Auto-Lite, GAR-2077.
 Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4304-A

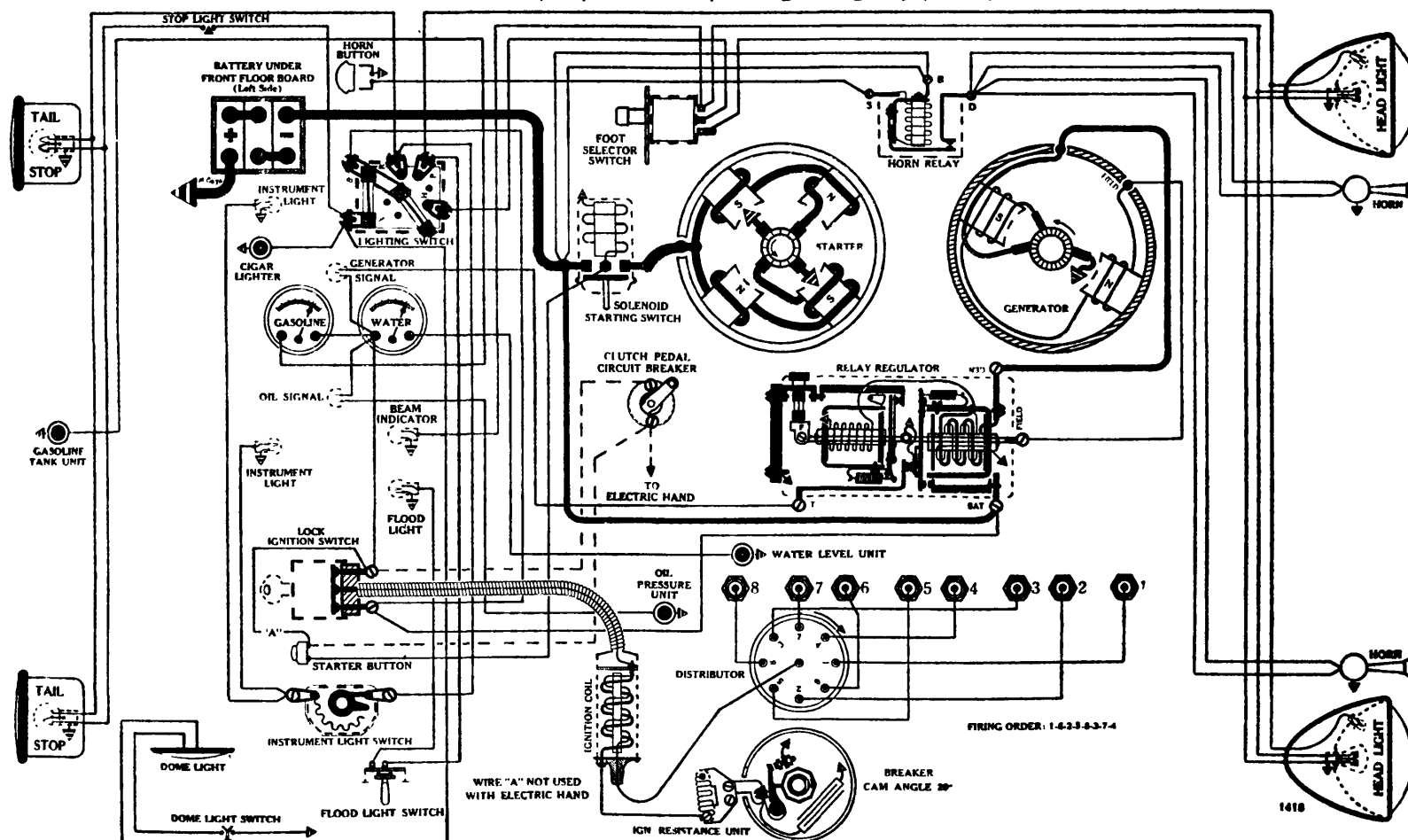
For Data see page 1418 (Straight Eights, 1936)

LIGHTING

Switch—Soreng-Manegold, No. 5770-A.
 Location—Behind instrument board.
 Fuses—Two 20 amp. fuses (type 3A-20) mounted on lighting switch.
 Foot Selector Switch—Douglas, No. 5331.
 Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2331 (Bar Filament); PARK—55; INSTRUMENT—55; FLOOD—63; SIGNALS—51; DOME—87; STOP AND TAIL—1158.

HUDSON

Models 64, 65, 66 and 67, Straight Eights, (1936)

Engine { Bore 3
Stroke 4-1/2

BATTERY

National, ST3, 6 volts. Positive Terminal Grounded

Starting Capacity—135 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—4.3.
Lighting Capacity—5.5 amps. for 20 hours (110 amp. hour).
Box—Length, 11 3/4; width, 7 1/4; height, 8-1/16 inches.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End

Auto-Lite, MAB-4075

For Data see page 1417 (6 cyl. 1936)

IGNITION

Rotation, R. H., Top View

Auto-Lite, IGP-4001-B

(Full Automatic Spark Advance)

Breaker—Contact separation .018 inch.

Cam Angles—Points closed 29 degrees; open 16 degrees (by actual tests).

Cam Angles—Points closed 27 1/2 degrees; open 17 1/2 degrees (official A-L data).

Contact Spring Tension—18 to 20 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "U.D.C." 1-8 registers with pointer cast in flywheel inspection hole. With rotor under No. 1 Dist. Cap terminal, breaker points should just open.

Spark Plugs—14 MM (Champion type J-8 A, used with standard compression engine—Champion type H-10 used with engines having compression ratio of 7 to 1). Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—17 1/2 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
800 (Intermediate)	400	3
1340	670	6
1880	940	9
2600	1300	13
3140	1570	16
3400 (Max.)	1700	17 1/2

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CE-4617.

Ign. Coil Only—A-L, CE-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-2233-BS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4701-6 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.6	12	1150	7.5
2	750	6.7	16	1400	7.9
4	850	6.9	20	1700	8.2
6	875	7.	21 1/2	2000	8.3
8	950	7.1	22	2200 (Max.)	8.4

Running Free—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—32 amps. at 4 1/2 volts.

Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5), in regulator unit.

Brush Spring Tension—22 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2077.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4304-A with TC-51 Resistance Unit

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.5 to 7.3 volts (hot or cold).

Opens—0 to 3 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

Regulator—

A-L Test 114

Contact Spring Tension—10 to 12 oz.

Points Open—8.0 volts (70° F.).

Points Close—6.7 volts.

For Regulator Adjustments at other temperatures see complete data in Technical Section.

Contact Opening—.005 inch (minimum).

Core Gap—.045 inch (contacts closed).

LIGHTING

Switch—Soreng-Manegold, No. 5770-A.

Location—Behind instrument board.

Fuses—Two 20 amp. fuses (type 3A-20) mounted on lighting switch.

Foot Selector Switch—Douglas, No. 5331.

Horn Relay—Delco-Remy, 268-T.

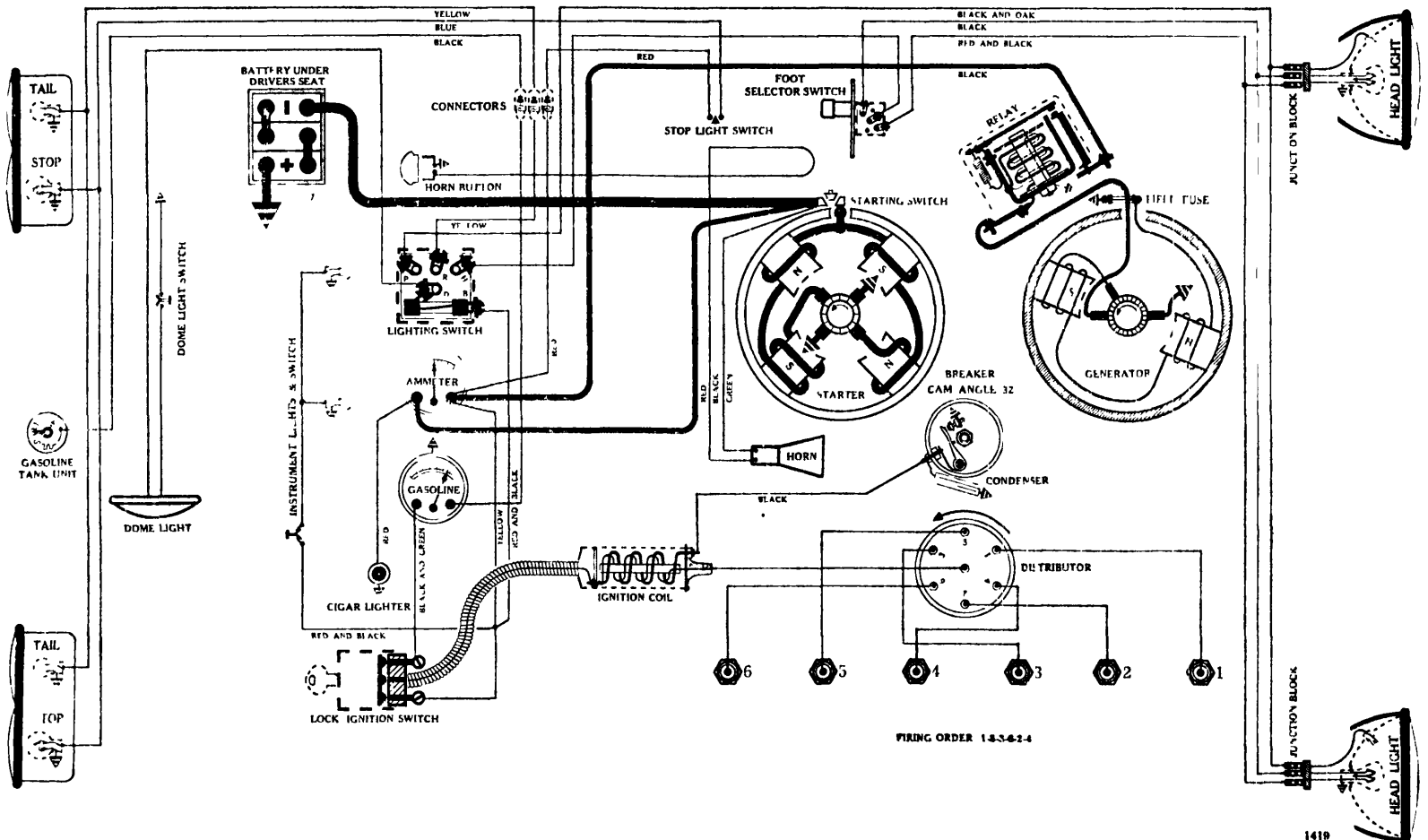
Lamps—Refer to "Lamp Data" in Technical Section—HEAD—2331

(Bar Filament); PARK—55; INSTRUMENT—55; FLOOD—63;

SIGNALS—51; DOME—87; STOP AND TAIL—1158.

HUPMOBILE

Model G, Series 618, 6 cyl., (1936)

Engine { B r 3-1/2
Strok 4-1/4

BATTERY

Willard, WS-2-15, 6 volts. Positive Terminal Grounded
Starting Capacity—122 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.3.
Lighting Capacity—5 amps. for 20 hours (100 amp. hour).
Box—Length, 10-5/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

A-L Test CU-277. Rotation, L. H., Com. End
Auto-Lite, MAJ-4044

Connection to Engine—Bendix Drive Type LCD11FX-10.
Running Free—67 amps. at 5½ volts, 4100 R.P.M.
Cranking Engine—150 amps. at 5.3 volts.
Engine Cranking Speed—138 R.P.M.
Stall Data (on Car)—425 amps. at 3.9 volts.
Lock Torque (for test bench use)—12 pound-feet, 550 amps. at 3 volts.
Brush Spring Tension—42 to 53 oz. on each (new brushes).
Starting Switch—Auto Lite, SW 3737, mounted on starter. Switch should not close with less than 5½ lbs. pull applied at right angles to hole in end of lever.
Armature—Auto-Lite, MAJ-2048.

IGNITION

A-L Test 378 Rotation, L. H., Top View
Auto-Lite, IGB-4319
(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
Cam Angles—Points closed 32 degrees; open 28 degrees (by actual tests).
Cam Angles—Points closed 34 degrees; open 26 degrees (official A-L data).
Contact Spring Tension—16 to 20 oz.
Timing—With No. 1 piston on compression stroke, slowly turn engine until flywheel mark "IGN. ADV." (found 7 degrees ahead of mark "DC 16") is in line with pinched bosses on front face of clutch housing. With rotor under No. 1 Dist. Cap terminal, breaker points should just open.
Spark Plugs—18-MM (Champion type C-7); Gap .026 to .030 inch.
Firing Order—1-5-3-6-2-4.
Automatic Advance—7 degrees (Distributor).
Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist.)
800 400 Start
1100 550 1
1660 830 3
2500 1250 6
2800 (Max.) 1400 7

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4619.
Ign. Coil Only—A-L, IG-3224-S.
Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-AWS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBK-4604 (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	760	6.2	10	1150	7.1
2	850	6.3	12	1250	7.3
4	925	6.5	14	1400	7.6
6	970	6.7	16	1600	7.8
8	1100	7.0	18	1800 (Max.)	8.0

Motoring Freely—5½ amps. at 6 volts.
Max. Stall Current—23 to 25 amps. at 5½ volts.
Field Test—3.9 to 4.3 amps. at 6 volts, across field coils in series.
Field Fuse—5 amps. (type 1A-5).
Brush Spring Tension—22 oz. Max. on each (new brushes).
Armature—Auto-Lite, GBK-2055.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4023

Closes—6¾ to 7½ volts.
Opens—½ to 2½ amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .030 inch, contact closed.

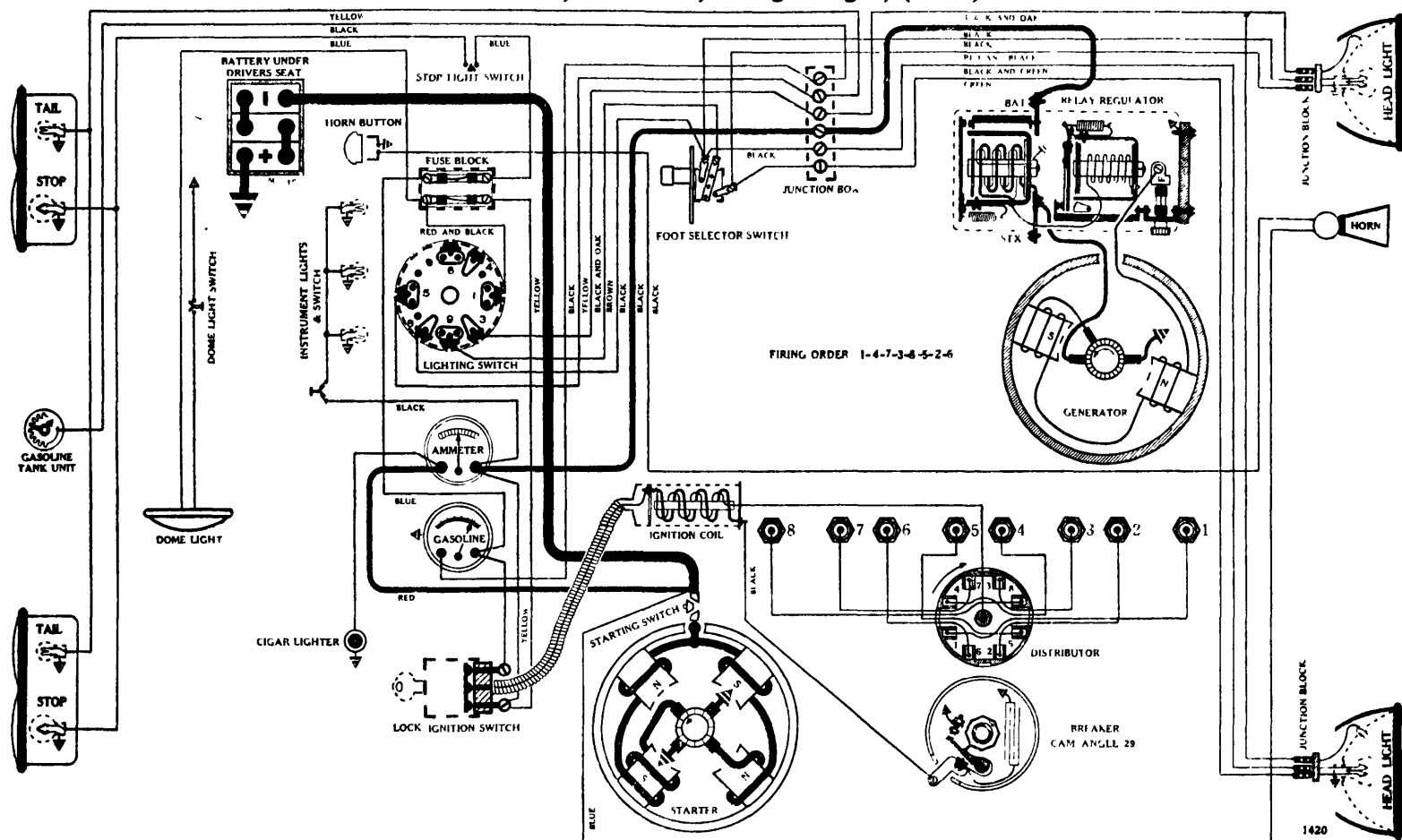
LIGHTING

Switch—Hupmobile, No. 91605, manufactured by Henry Cole—F. C. Hersee Companies.
Location—Behind instrument board.
Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back.
Foot Selector Switch—Clum, No. 9505.
Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—63; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

HUPMOBILE

Model N, Series 621, Straight Eight, (1936)

Engine { Bore 3-3/16
Stroke 4-3/4



BATTERY

Willard, WH-2-15, 6 volts. Positive Terminal Grounded

Starting Capacity—140 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—4.3.

Lighting Capacity—5.9 amps. for 20 hours (119 amp. hour).

Box—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End

Auto-Lite, MAB-4081

Connection to Engine—Bendix Drive, Type RCD10FXD-9.

Running Free—60 amps at 5½ volts, 3700 R.P.M.

Cranking Engine—140 amps. at 5.1 volts.

Engine Cranking Speed—132 R.P.M.

Stall Data (on Car)—375 amps. at 2.9 volts.

Lock Torque (for test bench use)—15½ pound-feet, 582 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW 3752, mounted on starter. Switch should not close with less than 5½ lbs. pull, applied at right angles to hole in end of lever.

Armature—Auto-Lite, MAB-2046.

IGNITION

A-L Test 354

Rotation, R. H., Top View

Auto-Lite, IGP-4003

Breaker—Contact separation .018 inch.

Cam Angles—Points closed 29 degrees; open 16 degrees (by actual tests).

Cam Angles—Points closed 27½ degrees; open 17½ degrees (official A-L data).

Contact Spring Tension—18 to 20 oz.

Timing—With No 1 piston on compression stroke, bring flywheel mark (found 15/16 inches, or 9 degrees ahead of "1-8 DC"), so that it will register with center line of flywheel housing peep hole. With rotor under No 1 Dist Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type C-7); Gap .026 to .030 inch.

Firing Order—1-4-7-3-8-5-2-6.

Automatic Advance—6½ degrees (Distributor).

Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist.)

800	400	Start
1530	765	2
2270	1135	4
3000	1500	6
3200 (Max.)	1600	6½

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CE-4611.

Ign. Coil Only—A-L, CE-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-BCS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4620-5 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.6	12	1150	7.5
2	750	6.7	16	1400	7.9
4	850	6.9	20	1700	8.2
6	875	7.	21½	2000	8.3
8	950	7.1	22	2200 (Max.)	8.4

Running Free—5 to 5½ amps. at 6 volts.

Max. Stall Current—32 amps. at 4½ volts.

Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5), in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116-B.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand.

Mounting plate held in any position by friction clamp washers.

RELAY — REGULATOR

Auto-Lite, TC-4302-A with TC-51G Resistance Unit

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.5 to 7.3 volts (hot or cold).

Opens—0 to 3 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

Regulator—Contact Spring Tension—10 to 12 oz.

A-L Test 119 Points Open—8.25 volts (70° F.).

Points Close—7.0 volts.

For Regulator Adjustments at other temperatures see complete data in Technical Section.

Contact Opening—.005 inch (minimum).

Core Gap—.045 inch (contacts closed).

LIGHTING

Switch—Clum, No. 9526.

Location—Behind instrument board.

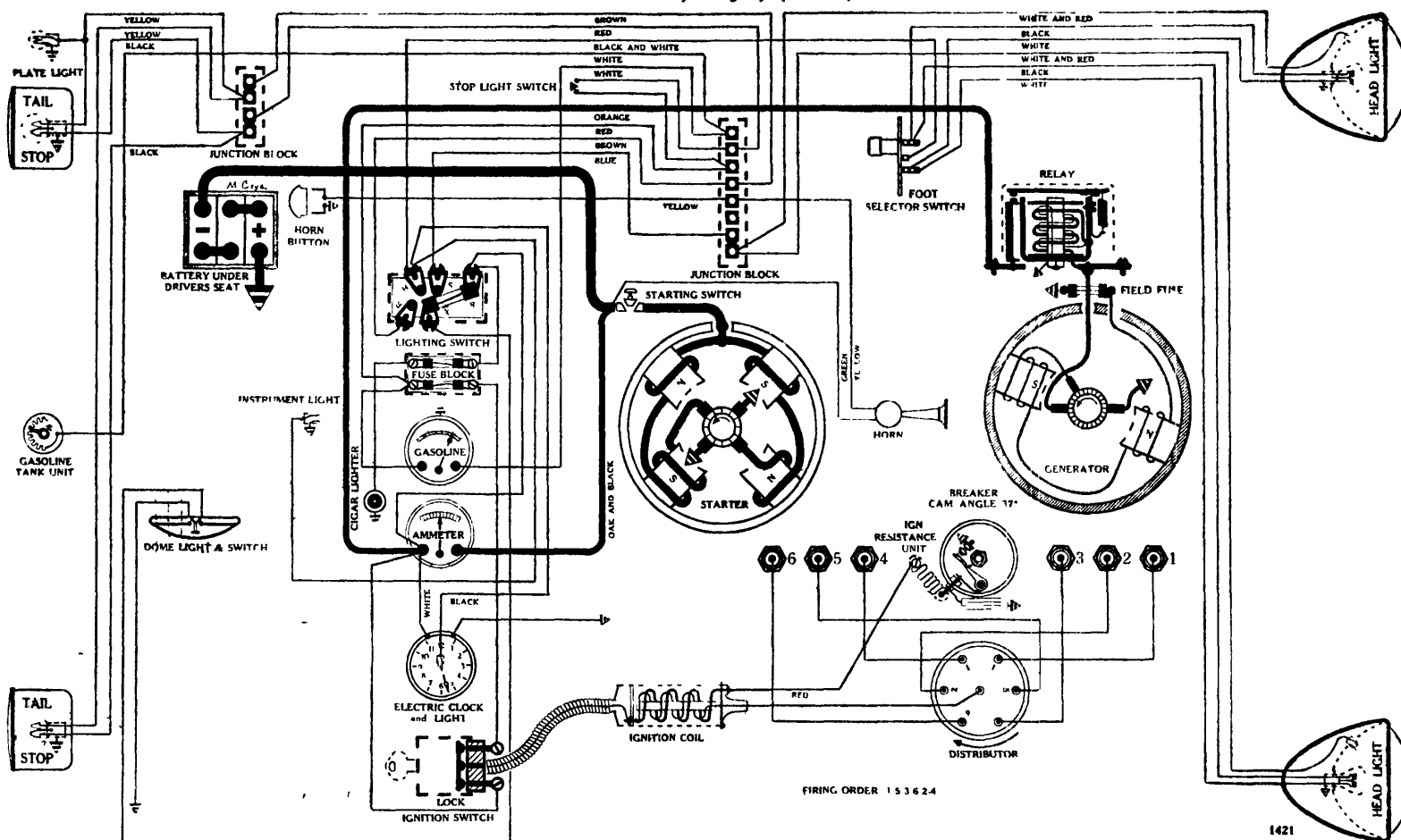
Fuses—Two 20 amp. fuses (type 3A-20) in fuse block on dash.

Foot Selector Switch—Clum, No. 9505.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—63; INSTRUMENT—81; DOME—81; STOP—87; TAIL—68.

LAFAYETTE

Series 3610, 6 cyl., (1936)

Engine {Bor 3-1/4
Str k 4-3/8**BATTERY**

U.S.L., KL-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1.

Lighting Capacity—5 amps. for 20 hours (100 amp. hour).

Box Length, 9-1/16; width, 7-1/16; height, 9-1/8 inches.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End

Auto-Lite, MAB-4076

Connection to Engine—Bendix Drive, Type LCD11FX-10

Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.

Cranking Engine—120 amps. at 5.4 volts.

Engine Cranking Speed—120 R.P.M.

Stall Data (on Car)—320 amps. at 3.5 volts.

Lock Torque (for test bench use)—15 1/2 pound-feet, 582 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Starting Switch—Auto-Lite SW 4005, mounted on toe board, operated by fully depressing clutch pedal.

Armature—Auto-Lite, MAB-2057.

IGNITION

A-L Test 435 (IGB-4317-A) Rotation, R. H., Top View

A-L Test 381 (IGB-4317-B) Auto-Lite, IGB-4317-A or IGB-4317-B
(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 37 degrees; open 23 degrees (by actual tests).

Cam Angles—Points closed 40 degrees; open 20 degrees (official A-L data).

Contact Spring Tension—16 to 20 oz.

Timing—With No. 1 piston on compression stroke, slowly turn engine until the mark "Ign" (the first line) on front vibration dampener is directly under pointer on chain cover. With rotor under No. 1 Dist Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type 7); Gap .025 inch. Gap .027 inch if radio suppressors are used.

Firing Order—1-5-3-6-2-4.

Automatic Advance—5 degrees (Distributor), (IGB-4317-A).

Automatic Advance—10 degrees (Distributor), (IGB-4317-B).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
600	300		1
900	450		2
1200	600		3
1500	750		4
1800	900		5
2100 (Max.)	1050		

The following is the Spark Advance Table for the IGB-4317-B Distributor.

		Start
600	300	2
1000	500	4
1400	700	6
1800	900	8
2200	1100	10
2600 (Max.)	1300	

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4626 or IG-4626-A.

Ign. Coil Only—A-L, IG-3224-S or IG-3224-DS.

Ign. Switch and Cable Assembly Less Lock A-L, CE-1187-BES or CE-1187-CNS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4601-5, (Belt Drive)

Performance Data—Gen. cold.

Amps	R.P.M.	Volts	Amps	R.P.M.	Volts
0	750	6.2	10	1150	7.1
2	850	6.3	14	1400	7.6
4	900	6.5	16	1600	7.8
6	950	6.7	18	1800 (Max.)	8
8	1050	7			

Motoring Freely—5.2 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5 1/2 volts.

Field Test—4.4 to 4.9 amps. at 6 volts across field coils in series.

Field Fuse—7 1/2 amps. (type 1A-7 1/2).

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2214.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014

Closes—6 3/4 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5820-A.

Location—Behind instrument board.

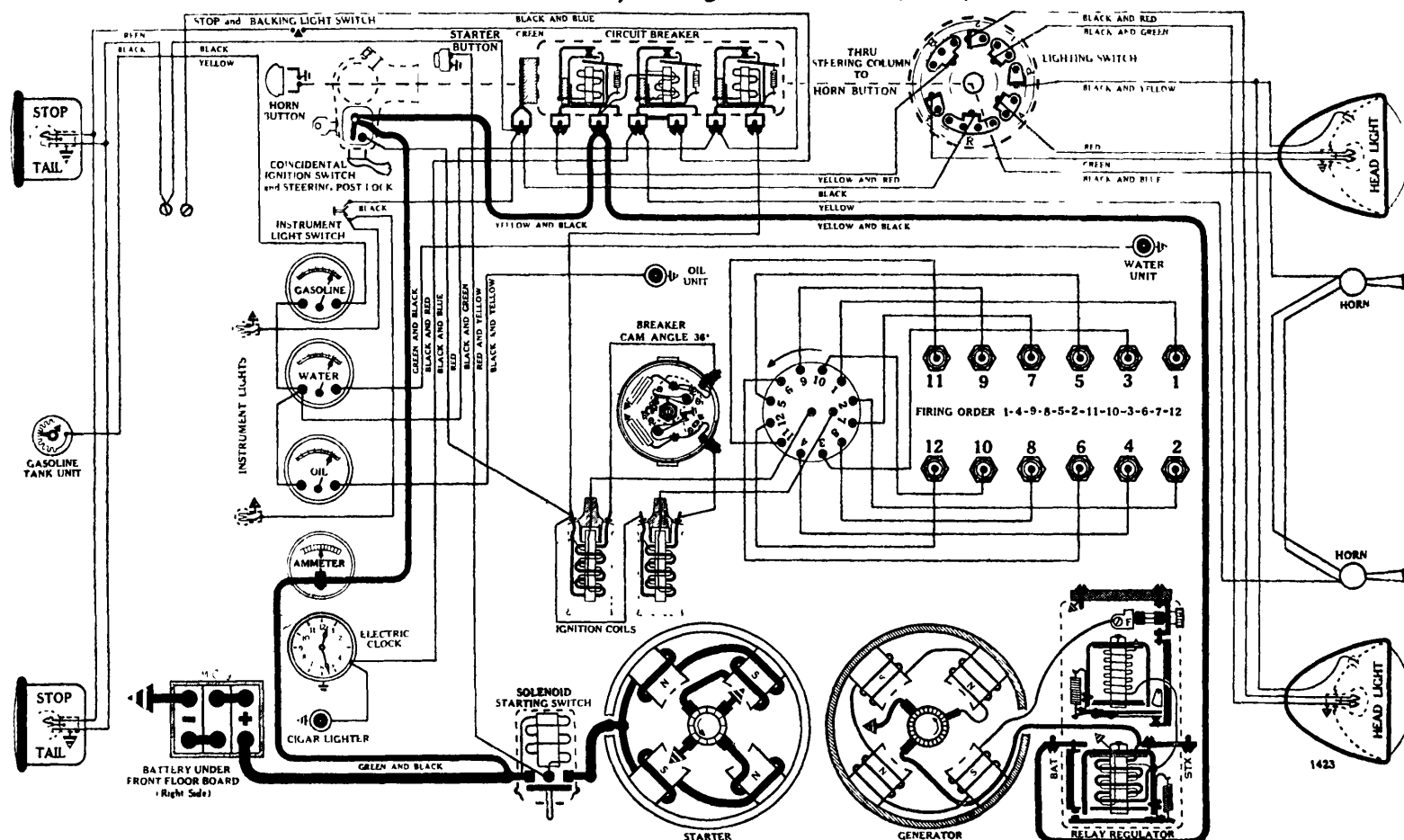
Fuses—(Lighting), Single 20 amp. fuse (type 3A-20) on switch back. (Cigar Lighter, Stop Light and Gas Gauge circuits), two 20 amp. fuses (type 3A-20) on fuse block behind instrument board.

Foot Selector Switch—Douglas No. 5392.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2381 (Bar Filament); PARK—55; INSTRUMENT—81; DOME—81; STOP AND TAIL—1158.

LINCOLN

Mod 1 K Series, 67 Degree "V" 12, (1936)

Engine { Bor 3-1/8
Strok 4-1/2**BATTERY**

Exide, X-21-L, 6 volts. Negative Terminal Grounded
 Starting Capacity—175 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—6.3.
 Lighting Capacity—7.3 amps. for 20 hours (147 amp. hour).
 Box—Length, 14 1/2; width, 7-5/16; height, 8 3/4 inches.

STARTER

A-L Test (U-346) Rotation, L. H., Com. End
 Auto-Lite, MAO-4003-B

Connection to Engine—Bendix Drive, Type RB10FXXTD.
 Running Free—44 amps. at 5 1/2 volts, 2700 R.P.M.
 Cranking Engine—150 amps. at 5.3 volts.
 Engine Cranking Speed—102 R.P.M.
 Stall Data (on Car)—450 amps. at 3.1 volts.
 Lock Torque (for test bench use)—34 pound-feet, 715 amps. at 3 volts.
 Brush Spring Tension—24 to 32 oz. on each (new brushes).
 Solenoid Starting Switch—Auto-Lite, SS-4004.
 Armature—Auto-Lite, MAO-2006.

IGNITION

A-L Test 395 (IGM-4003) Rotation, L. H., Top View
 A-L Test 446 (IGM-4003-A) Auto-Lite, IGM-4003 or IGM-4003-A
 (Full Automatic Spark Advance)

Breakers—Contact separation .020 inch on each.
 Cam Angles—Points closed 36 degrees; open 24 degrees (official A-L data and by actual tests).
 Contact Spring Tension—20 to 22 oz. on each.
 Synchronizing—Movable points open 33 1/2 degrees after stationary. Unequal intervals of 33 1/2, 26 1/2, 33 1/2, etc. degrees between interruptions. The stationary, or right hand set of breaker points control the right hand ignition coil, which distributes current through the "off center" high tension terminal on the distributor cap, and fires the right bank, or even numbered cylinders.
 Timing—Remove inspection cover on flywheel housing. Remove No. 2 spark plug (front cylinder, right block). Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "DC 2-12" registers with pointer in flywheel inspection hole. In this position the right hand or stationary set of breaker points should just open.
 NOTE: Flywheel marks "A 2" and "A-1" are not used when timing the ignition, and should be disregarded.
 Spark Plugs—18-MM (Champion type 7); Gap .022 inch.
 Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.
 NOTE: All odd cylinder numbers on left bank; No. 1 nearest radiator. All even numbers on right bank (see diagram). High tension wires run from numbered terminals on Dist. Cap to corresponding numbers on cylinder blocks.
 Automatic Advance—8 1/2 degrees (Distributor), (IGM-4003).
 Automatic Advance—12 degrees (Distributor), (IGM-4003-A).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
1300	650	2
2000	1000	4
3600 (Max.)	1800	8 1/2

The following is the Spark Advance Table for the IGM-4003-A Distributor.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
900 (Intermediate)	450	4
2290	1145	8
3680 (Max.)	1840	12

Ignition Coils—Auto-Lite, CE-4001-L.
 Ignition Switch—Oakes Steering Post and Ignition Lock No. 301172.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GBC-4103 (Driven by Timing Chain)

Performance Data Gen. cold. Field lead grounded to generator frame.					
Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	400	6.3	16	720	7.6
4	460	6.7	20	930	7.8
8	520	7.	22	1250 (Max.)	8.

Motoring Freely—5 amps. at 6 volts.
 Max. Stall Current—24 to 26 amps. at 6 volts.
 Field Test—2.4 to 2.7 amps. at 6 volts across field coils in series.
 Field Fuse—5 amps. (type 1A-5), in regulator unit.
 Brush Spring Tension—27 oz. Max. on each (new brushes).
 Armature—Auto-Lite, GBC-2035.
 Third Brush Adjustment—Turn adjusting screw, found on outside of commutator end housing just below oil cup, clockwise to increase charging rate.

RELAY-REGULATOR

Auto-Lite, TC-4302-A or 4305-A with TC-51 Resistance Unit
 A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

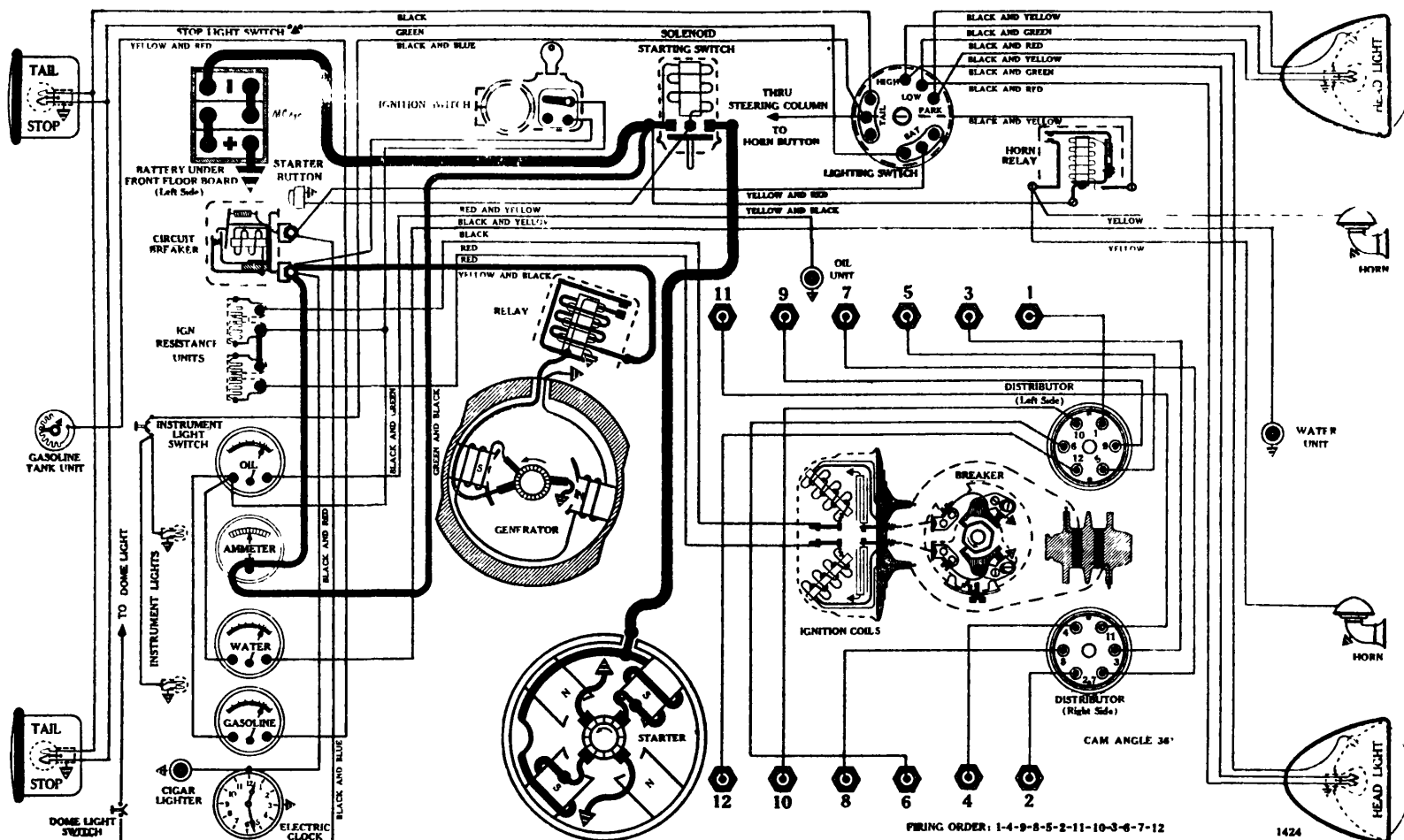
For Data refer to "Auto-Lite Two-Stage Regulators" in Technical Section, Test 119 (Both Units)

LIGHTING

Switch—R.B.M. Mfg. Co., Type 1301.
 Location—Foot of steering column.
 Circuit Breakers—Triple combination. Vibrating—Starts 25 to 30 amps. Operates 10 to 15. Lock-Out—Starts 25 to 30 amps. Operates with discharge of less than 1 amp.
 Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2820; PARK—55; INSTRUMENT—81; DOME—81; STOP AND TAIL—1158.

LINCOLN-ZEPHYR

Mod 1902, 75 Degree "V" e" 12, (1936)

 Engin { Bor 2-3/4
 Strok 3-3/4


BATTERY

Ford, 10-10655-C, 6 volts. Positive Terminal Grounded
 Starting Capacity—120 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—3.5.
 Lighting Capacity—4.8 amps. for 20 hours (96 amp. hour).
 Box—Length, 10-9/16; width, 7 1/4; height, 7 1/4 inches.

STARTER

Rotation, L. H., Com. End
 Zephyr, Type 18-11002

Connection to Engine—Bendix Drive, Type L11FX-10.
 Running Free—35 to 40 amps. at 6 volts, 3960 R.P.M.
 Cranking Engine—210 to 225 amps. at 4.75 volts.
 Engine Cranking Speed—100 R.P.M.
 Stall Data (on car)—325 amps. at 3.9 volts.
 Lock Torque (for test bench use)—14 pound-feet, 500 amps. at 3 volts.
 Brush Spring Tension—32 to 36 oz. on each (new brushes).
 Armature—Zephyr, 18-11005.

IGNITION

Rotation, L. H., Viewed from Front
 Zephyr, Type H-12000

(Full Automatic Spark Advance in conjunction with Vacuum Operated Governor Brake)

Breakers—Contact separation .014 to .016 inch.
 Cam Angles—Points closed from 35 to 38 degrees; open 25 to 22 degrees.
 Contact Spring Tension—24 to 26 oz. on each.
 Synchronizing—The left hand or stationary set of breaker points (viewed from driver's seat) fire the left cylinder bank. Movable points open 22 1/2 degrees after stationary. Unequal intervals of 22 1/2-37 1/2-22 1/2, etc. degrees between interruptions. To synchronize remove the breaker plate adjusting screw and graduated segment. This will expose an eccentric synchronizing screw which moves the right hand set of breaker points.
 Timing—Construction of ignition drive assembly makes it impossible to attach unit to engine other than in correct position. Provision is made for a slight variation in spark timing (3 1/2 degrees plus or minus), by moving the breaker plate adjusting screw (found on right side of distributor housing between mounting flange and right distributor cap) up, to increase spark advance, and down to retard. With the seven graduations divided equally each side of the reference mark on distributor housing, the engine will have an initial spark advance of 4 flywheel degrees, which theoretically is the correct timing position.

Spark Plugs—18-MM (Champion type 7); Gap .025 inch.

Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.

Automatic Advance—8 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
(Tests to be made with Governor free—Vacuum Brake Released)		Start
400	200	
600	300	2
980	490	4
1440	720	6
1900 (Max.)	950	8

NOTE: Vacuum brake should be so adjusted that with no vacuum to raise the plunger the centrifugal force of the spark advance weights will overcome the brake drag and cam will start to advance at between 400 to 450 R.P.M. (Distributor).

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301306.

GENERATOR

Rotation, L. H., Com. End

Zephyr, 68-10,000 (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.5	10	1220	7.3
2	820	6.7	12	1350	7.5
4	900	6.8	14	1510	7.7
6	1000	7.0	16	1720	7.8
8	1125	7.2	18	2170 (Max.)	8.0

Motoring Freely—6 amps. at 6 volts.

Max. Stall Current—25 amps. at 5 volts.

Field Test—5 1/4 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on main; 20 to 24 oz. on third.

Armature—Zephyr, 18-10005-A.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Zephyr, 68-10505

Closes—6 1/2 to 7 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .020 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Zephyr, 3616-A or 3616-B.

Location—Foot of steering column. Lights controlled by lever on steering wheel. Wires soldered to terminals.

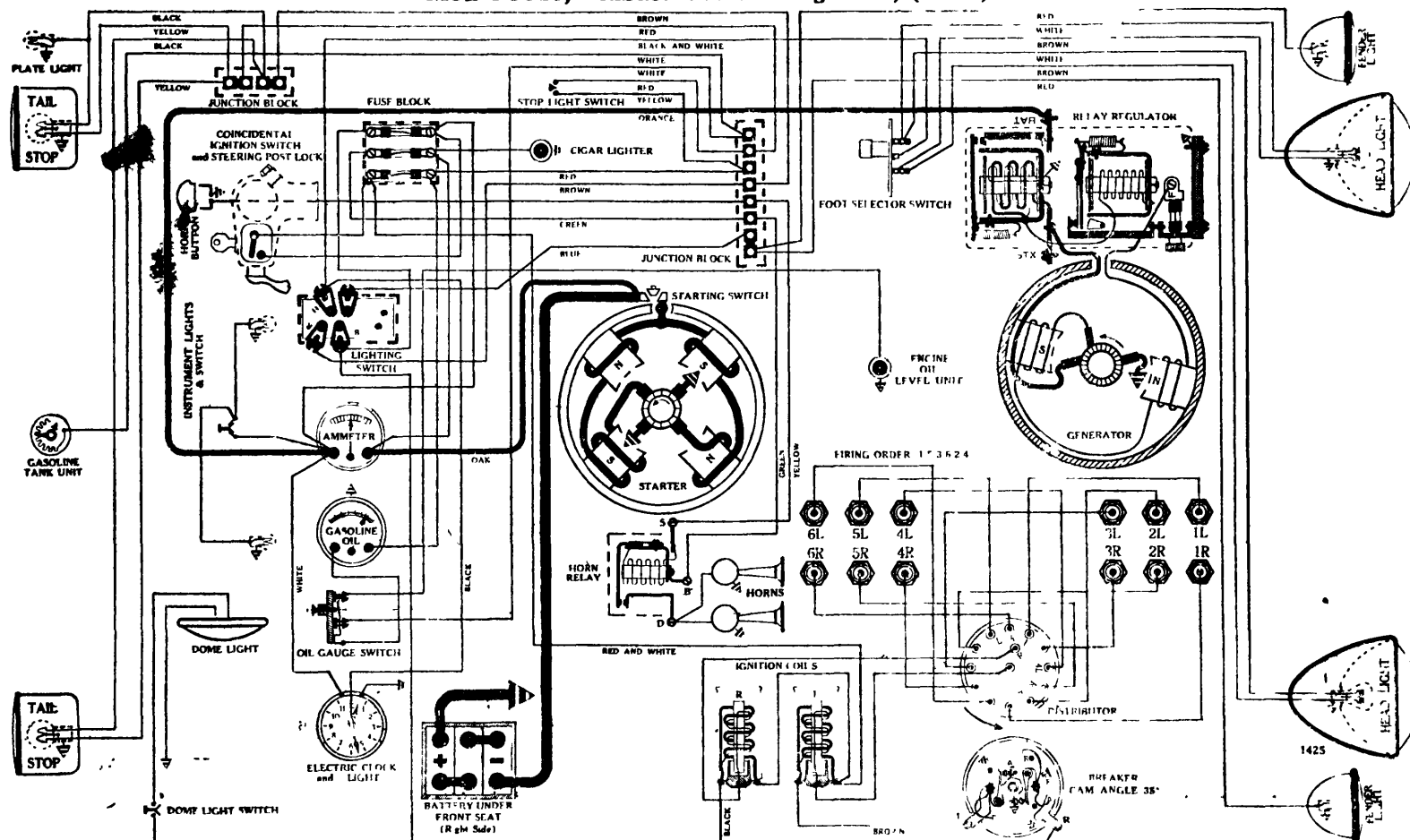
Circuit Breaker—R.B.M. Mfg. Co. No. 1640. Starts to operate with discharge of from 25 to 30 amps. Operates with discharge of from 10 to 15 amps.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

NASH

 Engine (Bore 3-3/8
Stroke 4-3/8)

Mod 13620, Ambassador Twin Ign. Six, (1936)



BATTERY

U.S.L., KL-1-13, 6 volts. Positive Terminal Grounded
Starting Capacity—120 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1.
Lighting Capacity—5 amps. for 20 hours (100 amp. hour).
Box—Length, 9-1/16; width, 7-1/16; height, 9 3/4 inches.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End
Auto-Lite, MAB-4077
Connection to Engine—Bendix Drive, Type LCD11FX-10.
Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.
Cranking Engine—120 amps. at 5.3 volts.
Engine Cranking Speed—144 R.P.M.
Stall Data (on car)—340 amps. at 3.7 volts.
Lock Torque (for test bench use)—15 1/2 pound-feet, 582 amps. at 3 volts.
Brush Spring Tension—42 to 53 oz. on each (new brushes).
Starting Switch—Auto-Lite, VC-4002 (vacuum controlled, clutch pedal operated).
Armature—Auto-Lite, MAB-2057.

IGNITION

A-L Test 460 (IGE-4012-A) Rotation, L. H., Top View
A-L Test 477 (IGE-4012-B) Auto-Lite, IGE-4012-A or IGE-4012-B
(Full Automatic Spark Advance)
Breakers—Contact separation .020 inch.
Cam Angles—Points closed 35 degrees; open 25 degrees (official A-L data and by actual tests).
Contact Spring Tension—16 to 20 oz. on each.
Synchronizing—Adjust both breakers to open simultaneously.
Timing—With No. 1 piston on compression stroke, slowly turn engine until the mark "Ign" (the first line) on front vibration dampener is directly under pointer on timing chain cover. With rotor ends under No. 1 Dist. Cap Terminals, both sets of breaker points should just open.
Spark Plugs—14-MM (AC type K-7); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Automatic Advance—9 degrees (Distributor) both units.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400	200	Start
610	305	2
820	410	4
1150	575	7
1360 (Max.)	680	9

The following is the Spark Advance Table for the IGE-4012-B Distributor.

400	200	Start
750	375	2
1110	555	4
1460	730	6
2000 (Max.)	1000	9

Ignition Coils—Auto-Lite, CE-4402-A.
Ignition Switch—Oakes Steering Post and Ignition Lock No. 301175 or 301312.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4601-5 or GBR-4602-4 (Belt Drive, Air Cooled)
NOTE: If GAR-4601, without regulator, refer to 1935 Model 3520, Twin Ign. Advanced Six. The following data for GBR-4602-4.

Performance Data—Gen. cold. Field lead grounded to generator.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	800	6.5	12	1250	7.5
2	880	6.7	14	1350	7.6
4	950	6.8	16	1480	7.8
6	1020	7.1	18	1650	8.0
8	1090	7.1	20	1900	8.1
10	1175	7.3	22	2200 (Max.)	8.2

Running Free—5.8 to 6.4 amps. at 6 volts.
Max. Stall Current—26 to 28 amps. at 6 volts.
Field Test—4.1 to 4.5 amps. at 6 volts across field coils in series.
Field Fuse—5 amps. (type 1A-5), in regulator unit.
Brush Spring Tension—36 oz. Max. on each (new brushes).
Armature—Auto-Lite, GAR-2116.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4313-A with TC-51 Resistance Unit

Cut-Out Relay—Closes—6.5 to 7.25 volts.
(25 ampere) Opens—.5 to 2.5 amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .030 inch, contacts closed.
Regulator—Contact Spring Tension—10 to 12 oz.
A-L Test 119 Points Open—8.25 volts (70° F.).
Points Close—7.0 volts.
Contact Opening—.005 inch (minimum).
Core Gap—.045 inch (contacts closed).

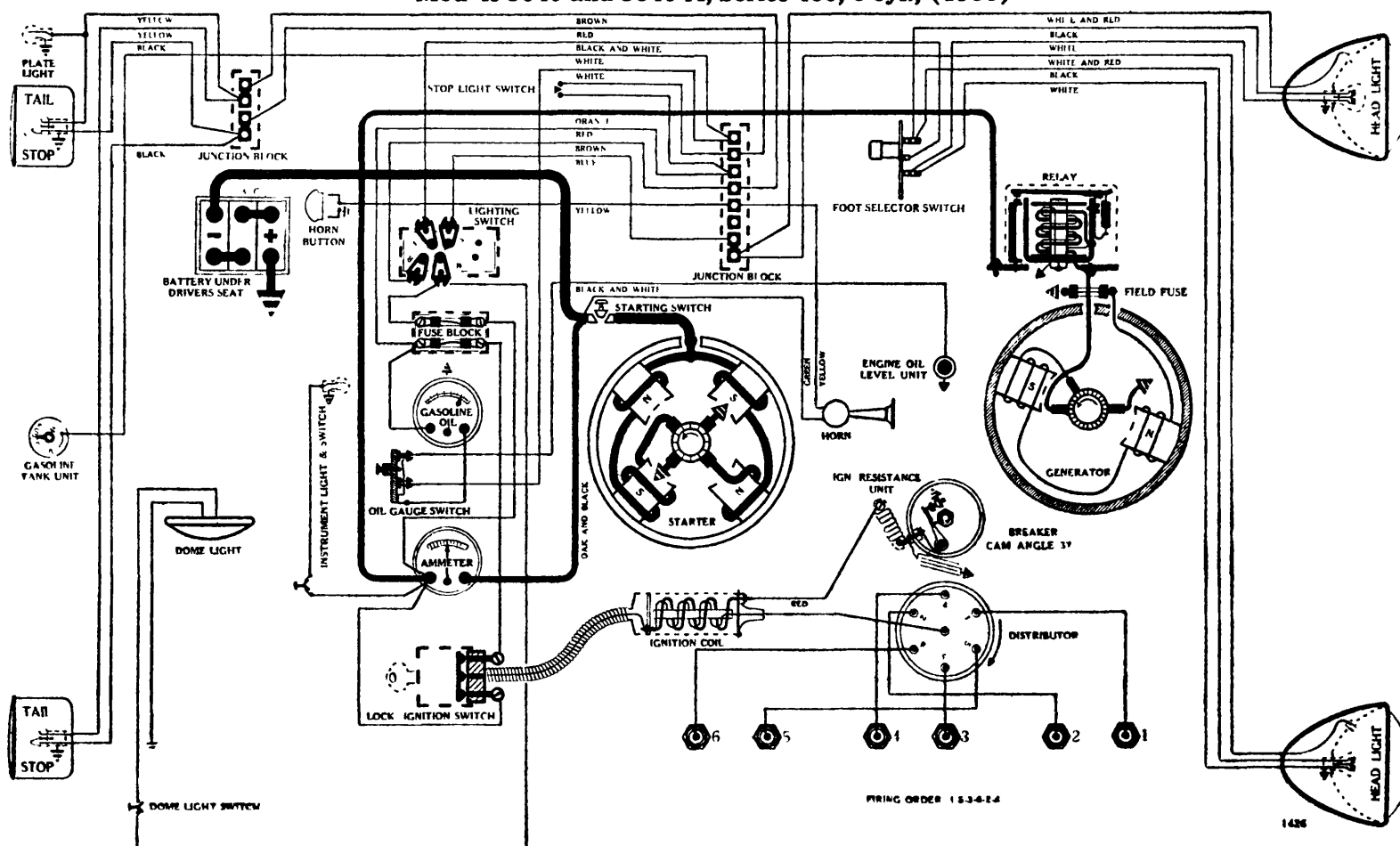
For adjustments at other temperatures see complete data in Technical Section.

LIGHTING

Switch—Soreng-Manegold, A-5820-A.
Location—Behind instrument board.
Fuses—Three 20 amp. fuses with spare (type 3A-20), mounted on fuse block behind instrument board.
Foot Selector Switch—Douglas, No. 5392.
Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2331 (Bar Filament); FENDER—55; INSTRUMENT—63; DOME—81; STOP AND TAIL—1158.

NASH

Mod ls 3640 and 3640-A, Series 400, 6 cyl., (1936)

Engine {B r 3-3/8
Strok 4-3/8

BATTERY

U.S.L., KI-1-13, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1.

Lighting Capacity—5 amps. for 20 hours (100 amp. hour).

Box—Length, 9-1/16; width, 7-1/16; height, 9 1/4 inches.

Cranking Engine—140 amps. at 5.4 volts.

Engine Cranking Speed—132 R.P.M.

Stall Data (on Car)—400 amps. at 3.8 volts.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End

Auto-Lite, MAB-4076

Connection to Engine Bendix Drive, Type LCD11FX-10.

Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.

Lock Torque (for test bench use)—15 1/2 pound-feet, 582 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-4005, mounted on sub-frame, operated by fully depressing clutch pedal.

Armature—Auto-Lite, MAB-2057.

IGNITION

A-L Test 461 (both units)

Rotation, R. H., Top View

Auto-Lite, IGB-4328-A or IGB-4328-B

(Full Automatic Spark Advance)

Breaker Contact separation .020 inch.

Cam Angles—Points closed 37 degrees; open 23 degrees (by actual tests).

Cam Angles—Points closed 40 degrees; open 20 degrees (official A-L data).

Contact Spring Tension—16 to 20 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when mark "DC" on front vibration dampener is directly under pointer on timing chain cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (AC type G-9); Gap .025 inch

Firing Order—1-5-3-6-2-4.

Automatic Advance—12 degrees (Distributor), both units.

Both units have the same Automatic Spark Advance characteristics.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
774	387	3
1000 (Intermediate)	500	7
1400	700	9
2000 (Max.)	1000	12

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4626-A.

Ign. Coil Only—IG-3224-DS.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-CNS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4618-2 (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	12	1350	7.5
4	900	6.8	16	1740	7.8
8	1125	7.2	18	2200 (Max.)	8.0

Motoring Freely—4 1/2 amps. at 6 volts.

Max. Stall Current—22 to 24 amps. at 5.4 volts.

Field Test—3.7 to 4.1 amps. at 6 volts.

Field Fuse—5 amps. (type 1A-5).

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2155.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014

Closes—6 3/4 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap .010 to .030 inch, contacts closed.

LIGHTING

Switch Soreng-Manegold, No. A-5820-A.

Location—Behind instrument board.

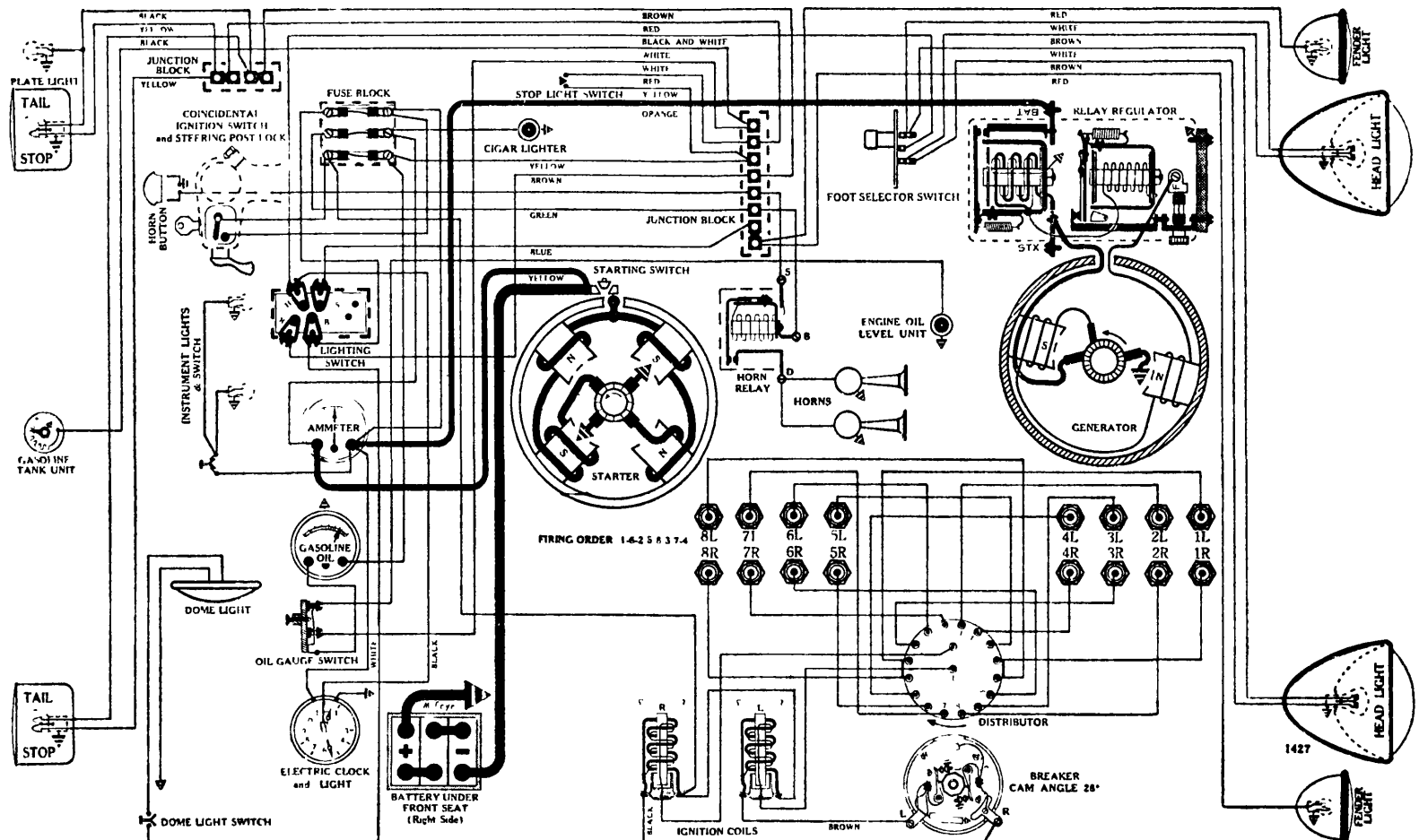
Fuses—Two 20 amp. fuses (type 3A-20) mounted on fuse block, under edge of instrument board, left side.

Foot Selector Switch—Douglas No. 5392.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2331 (Bar Filament); PARK—55; INSTRUMENT—63; DOME—64; STOP AND TAIL—1158.

NASH

M del 3680, Ambassador Twin Ign. Straight Eight, (1936)

Engine { Bor 3-1/8
Str k 4-1/4

BATTERY

U.S.L., KW-15A, 6 volts. Positive Terminal Grounded

Starting Capacity—140 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.7.

Lighting Capacity—5.8 amps. for 20 hours (116 amp. hour).

Box - Length, 10 1/4; width, 7; height, 9 1/8 inches.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End

Auto-Lite, MAB-4054

Connection to Engine -Bendix Drive, Type LCD11FX-10.

Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.

Cranking Engine—130 amps. at 5.3 volts.

Engine Cranking Speed—108 R.P.M.

Stall Data (on car)—420 amps. at 3.8 volts.

Lock Torque (for test bench use)—15 1/2 pound-feet, 582 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (new brushes).

Starting Switch—Auto-Lite, VC-4003 (vacuum controlled, clutch pedal operated).

Armature - Auto-Lite, MAB-2047.

IGNITION

A-L Test 391 Rotation, R. H., Top View

Auto-Lite, IGK-4101

(Full Automatic Spark Advance)

Breakers -Contact separation .018 inch on each.

Cam Angles -Points closed 28 degrees; open 17 degrees (official A-L data and by actual tests).

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Adjust both breakers to open simultaneously.

Equal 45 degree intervals between interruptions.

Timing— With No 1 piston on compression stroke, slowly turn engine until the mark "Ign" (the first line) on front vibration dampener is directly under pointer on timing chain cover. With both ends under No 1 Dist. Cap Terminals, both sets of breaker points should just open.

Spark Plugs—14-MM (AC type K-12); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400	200	Start
1040	520	6
1480	740	10
1900	950	14
2000 (Max.)	1000	15

Ignition Coils—Auto-Lite, CE-4402-A.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301175 or 301312.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBR-4602-4 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	800	6.5	12	1250	7.5
2	880	6.7	14	1350	7.6
4	950	6.8	16	1480	7.8
6	1020	7.	18	1650	8.0
8	1090	7.1	20	1900	8.1
10	1175	7.3	22	2200 (Max.)	8.2

Running Free—5.8 to 6.4 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—4.1 to 4.5 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5), in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4313-A with TC-51 Resistance Unit

Cut-Out Relay—Closes—6.5 to 7.25 volts.

(25 ampere) Opens—.5 to 2.5 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

Regulator—Contact Spring Tension—10 to 12 oz.

A-L Test 119 Points Open—8.25 volts (70° F.).

Points Close—7.0 volts.

Contact Opening—.005 inch (minimum).

Core Gap—.045 inch (contacts closed).

For adjustments at other temperatures see complete data in Technical Section.

LIGHTING

Switch—Soreng-Manegold, A-5820-A.

Location—Behind instrument board.

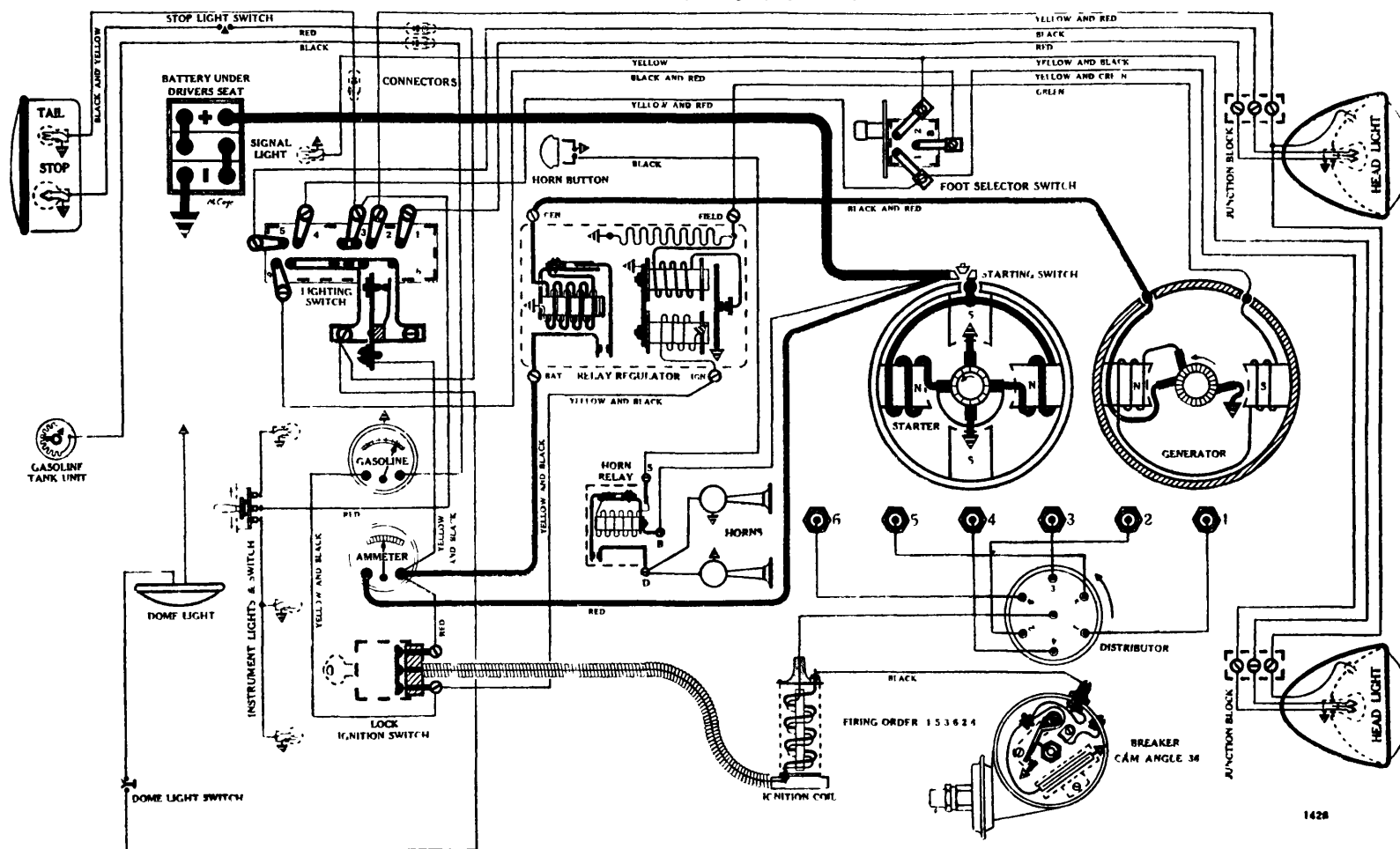
Fuses—Three 20 amp. fuses with spare (type 3A-20), mounted on fuse block behind instrument board.

Foot Selector Switch—Douglas, No. 5392.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2331 (Bar Filament); FENDER—55; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

OLDSMOBILE

M d l F-36, 6 cyl., (1936)

 Engin { Bore 3-5/16
 Str k 4-1/8


BATTERY

Delco-Remy, 15-T, 6 volts. Negative Terminal Grounded
 Starting Capacity—115 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—2.75.
 Lighting Capacity—4.7 amps. for 20 hours (94 amp. hour).
 Box—Length, 8-15/16; width, 7; height, 8-11/16 inches.

STARTER

D-R Test 368 Rotaton, L. H., Com. End .Group 46
 Delco-Remy, 738-S

Connection to Engine—Mechanical gear shift, incorporating an over-running clutch.
 Initial movement of gear shifting lever causes pinion to engage with flywheel.
 Further movement of lever closes switch on motor

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—90 amps. at 5.3 volts.

Engine Cranking Speed—108 R.P.M.

Stall Data (on Car)—330 amps. at 3.8 volts.

Lock Torque (for test bench use)—12 pound-feet, 475 amps. at 3.63 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test 118 Rotation, L. H., Top View .Group 81
 Delco-Remy, 647-C

(Full Automatic Spark Advance in conjunction with Delco-Remy
 681-A Vacuum Advance Unit, which controls position of
 Breaker Plate)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 36 degrees; open 24 degrees.

Contact Spring Tension—17 to 21 oz.

Distributor Quadrant—Before timing ignition loosen hold down plate bolt on back
 of distributor, and set pointer in line with "O" graduation on scale.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke
 Stop when the steel ball, pressed into flywheel (located at exact T.D.C.) registers
 with pointed screw at the timing hole. With rotor under No. 1 Dist. Cap Terminal,
 breaker points should just open.

Spark Plugs—18-MM (AC type G-9); Gap .030 to .033 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance Unit (Delco-Remy 681-A; test N. 660)—7½ degrees (Dist.
 advance) Starts with vacuum of from 5 to 7 inches mercury Requires vacuum
 of from 15½ to 18½ inches for full travel

Automatic Advance—13½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
390	195	Start
610	305	2
800 (Intermediate)	400	3¾
1290	645	6
1930	965	9
2580	1290	12
2900 (Max.)	1450	13½

Ignition Coil—Delco-Remy, 536-E.

Ignition Switch and Cable—Delco-Remy, 435-B.

GENERATOR

D-R Test 1271 Rotaton, L. H., Com. End .Group 24
 Delco-Remy, 936-T (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field terminal grounded to gener-
 ator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	750	6.5	12	1350	7.7
4	900	6.9	16	1750	8.1
8	1100	7.3	22	3300 (Max.)	8.5

Motoring Freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5½ volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20
 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Charging Adjustment—Fixed third brush. External vibrating point
 voltage regulation.

RELAY-REGULATOR

D-R Test 1294 Delco-Remy, 5588
 For Data see page 1429 (Straight Eight, 1936).

LIGHTING

Switch—Delco-Remy, 479-K. A combination switch with overload
 lighting thermostat.

Location—Behind instrument board.

Overload Thermostat—Opens when load exceeds 30 amps. Limits
 current flow to from 5 to 15 amps.

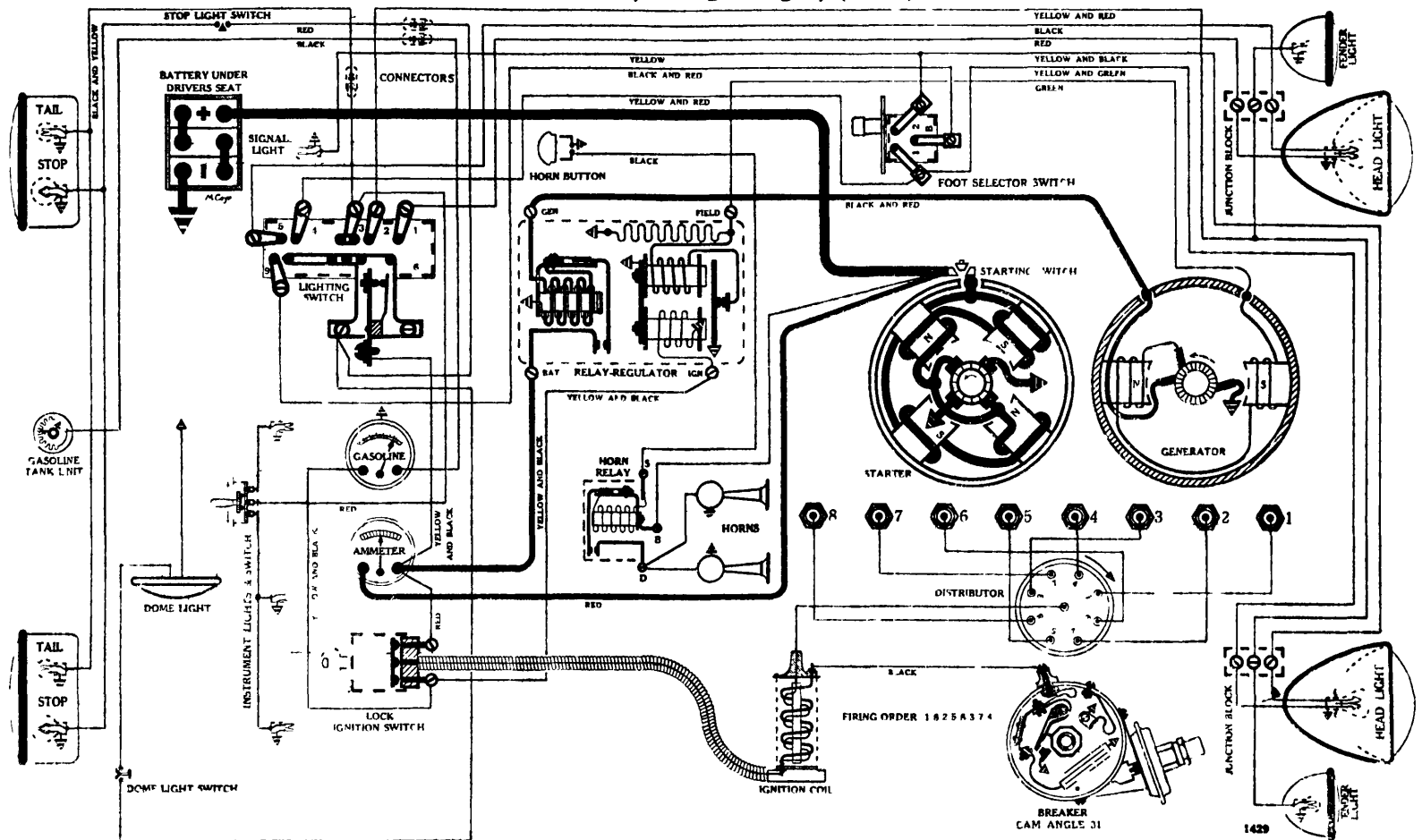
Horn Relay—Delco-Remy, 268-L.

Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320;
 PARK—55; INSTRUMENT—63; BEAM SIGNAL—51; FRONT
 COMPARTMENT—51; ELECTRIC CLOCK—55; DOME—81;
 STOP—87; TAIL—63.

OLDSMOBILE

Mod 1 L-36, Straight Eight, (1936)

Engin { B re 3
Stroke 4-1/4

BATTERY

Delco Remy, 17-K, 6 volts. Negative Terminal Grounded
 Starting Capacity—131 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—3.25.
 Lighting Capacity—5.5 amps. for 20 hours (110 amp. hour).
 Box Length, 10 1/4, width, 7; height, 8 5/8 inches.

STARTER

D-R Test 382 Rotation, L. H., Com. End Group 47
 Delco-Remy, 727-Z

(Connection to Engine—Mechanical gear shift, incorporating an over-running clutch.
 Initial movement of gear shifting lever causes pinion to engage with flywheel
 Further movement of lever closes switch on motor
 Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.
 Running Free—60 amps. at 5 volts, 6000 R.P.M.
 Cranking Engine—90 amps. at 5.2 volts.
 Engine Cranking Speed—96 R.P.M.
 Stall Data (on Car)—380 amps. at 3.5 volts.
 Lock Torque (for test bench use) 15 pound-feet, 600 amps. at 3.0 volts.
 Brush Spring Tension—24 to 28 oz. on each (new brushes).
 Starting Switch—Delco-Remy, 820052.
 Armature—Delco-Remy, 823881.

IGNITION

D-R Test 120 Rotation, R. H., Top View Group 63
 Delco-Remy, 663-K

(Full Automatic Spark Advance in conjunction with Delco-Remy
 681-B Vacuum Advance Unit, which controls position of
 Breaker Plate)

Breaker—Contact separation .015 inch.
 Cam Angles—Points closed 31 degrees; open 14 degrees
 Contact Spring Tension—19 to 23 oz.
 Distributor Quadrant—Before timing ignition loosen hold down plate bolt on back
 of distributor, and set pointer in line with "O" graduation on scale
 Timing—Slowly turn engine until No. 6 piston is coming up on compression stroke
 Stop when the steel ball pressed into the flywheel, registers with pointed screw at
 the timing hole. With rotor under No. 6 Dist. Cap Terminal breaker points should
 just open
 Spark Plugs—18-MM (AC type G-9); Gap .030 to .033 inch.
 Firing Order—1-6-2-5-8-3-7-4.
 Vacuum Advance Unit (Delco-Remy 681-B; test No. 660)—5 degrees (Dist.
 advance). Starts with vacuum of from 5 to 7 inches mercury Requires vacuum
 of from 13 to 16 inches for full travel
 Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist)
350	175	Start
580	290	2
800 (Intermediate)	400	4
1620	810	7
2440	1220	10
2980	1490	12
3800 (Max.)	1900	15

Ignition Coil—Delco-Remy, 536-E.

Ignition Switch and Cable—Delco-Remy, 435-B.

GENERATOR

D-R Test 1271 Rotation, L. H., Com. End Group 24
 Delco-Remy, 936-T (Belt Drive, Air Cooled)
 For Data see page 1428 (6 cyl., 1936).

RELAY-REGULATOR

D-R Test 1294 Delco-Remy, 5588
 A combination of Cut-Out Relay and Vibrating Point V Itag
 Regulator

Cut-Out Relay—Closes—6.5 to 7.0 volts.
 Opens—0 to 3 amps. discharge at 6.8 volts.
 Contact Gap—.018 to .025 inch.
 Core Gap—.018 to .022 inch, contacts closed.
 Contact Spring Tension—2.7 to 3.5 oz.
 Gap Between Fiber Bumper and Contact Spring
 Stop—.008 to .013 inches (armature up).
 Air Gap—.060 to .070 inches (armature pressed
 down until fiber bumper just touches stop).
 Contact Opening—.015 to .025 inches (armature all
 way down).
 Voltage Setting Unit operates at 7.55 to 7.85 volts
 with 8 to 10 amp (charging rate), 70 degrees F.

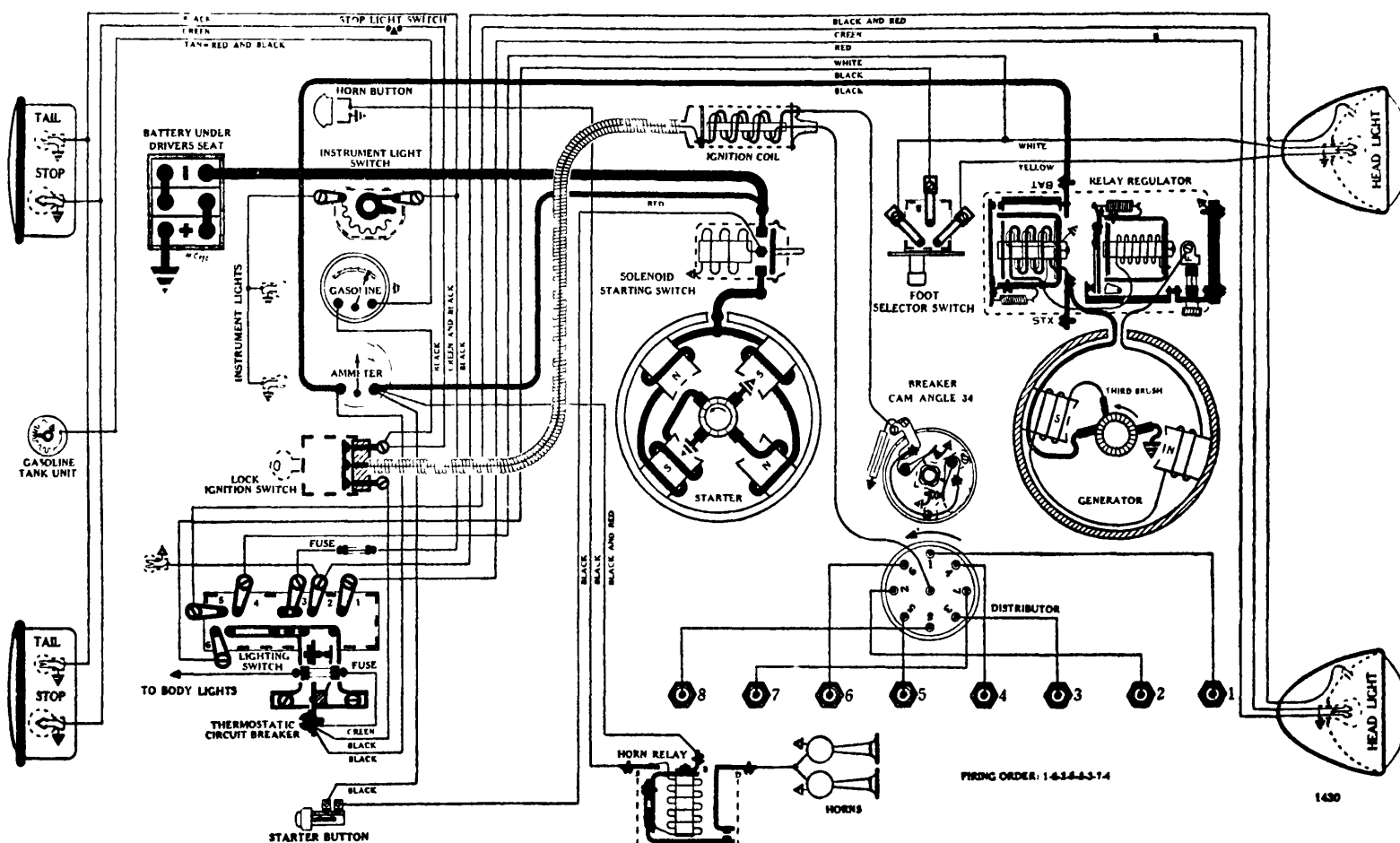
LIGHTING

Switch—Delco-Remy, 479-K A combination switch with overload
 lighting thermostat.
 Location—Behind instrument board.
 Overload Thermostat—Opens when load exceeds 30 amps. Limits
 current flow to from 5 to 15 amps.
 Horn Relay—Delco-Remy, 268-L.
 Foot Selector Switch—Delco-Remy, 471-T.
 Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320;
 FENDER—63; INSTRUMENT—63; BEAM SIGNAL—51;
 FRONT COMPARTMENT—51; ELECTRIC CLOCK—55;
 DOME—81; STOP—87; TAIL—63.

PACKARD

Series On Twenty-B, Straight Eight, (1936)

Engine {B r 3-1/4
Strok 4-1/4



BATTERY

Prest-O-Lite, HP2-17, 6 volts. Positive Terminal Grounded
Starting Capacity—133 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.5.
Lighting Capacity—5.7 amps. for 20 hours (114 amp. hour).
Box—Length, 10 1/4; width, 7; height, 8 1/2 inches.

STARTER

A-L Test CU-430 Rotation, L. H., Com. End
Auto-Lite, MAX-4006

Connection to Engine—Bendix Drive, Type A-1729.

Running Free—65 amps. at 5 1/2 volts, 5300 R.P.M.

Cranking Engine—170 amps. at 5.3 volts.

Engine Cranking Speed—144 R.P.M.

Stall Data (on car)—450 amps. at 3.7 volts.

Lock Torque (for test bench use)—16 1/2 pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—31 to 42 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4001.

Armature—Auto-Lite, MAW-2006.

IGNITION

A-L Test 436 Rotation, L. H., Top View

Auto-Lite, IGH-4026-A

(Full Automatic Spark Advance)

Breakers—Contact separation .020 inch.

Cam Angles—Points closed 34 degrees, open 56 degrees (each breaker separately)
Primary circuit closed 34 degrees, open 11 degrees (with both breakers operating)
—(by actual tests).

Cam Angles—Points closed 32 degrees, open 58 degrees (each breaker separately)
Primary circuit closed 32 degrees, open 13 degrees (with both breakers operating)
—(official A. L. data)

Contact Spring Tension—16 to 20 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary.

Equal 45 degree intervals between interruptions.

Timing—Set pointer of Fuel Compensator at zero. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when white line on flywheel located 7 degrees before flywheel mark "No. 1 UP D C" is in line with pointer at the timing inspection hole. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—14-MM (AC type K-7); Gap .028 to .030 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
1360	680	2
2500	1250	5
3260	1630	7
4400 (Max.)	2200	10

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CE-4614.

Ign. Coil Only—A-L, CE-3224-CCS.

Ign. Switch and Cable Assembly with Lock—A-L, CE-1187-CCS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4611-A-5 or GBR-4601-5

Both units Belt Drive and Air Cooled. If GAR-4611-A-5 refer to 1935 Packard, Model 120. The following data is for GBR-4601-5.

Performance Data—Gen. cold. Field lead grounded to generator.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	800	6.5	12	1250	7.5
2	880	6.7	14	1350	7.6
4	950	6.8	16	1480	7.8
6	1020	7.	18	1650	8.0
8	1090	7.1	20	1900	8.1
10	1175	7.3	22	2200 (Max.)	8.2

Running Free—5.8 to 6.4 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—4.1 to 4.5 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5), in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4302-B with TC-51E Resistance Unit

Cut-Out Relay—Closes—6.5 to 7.25 volts.

Opens—5 to 2.5 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

Regulator—

A-L Test 119

Contact Spring Tension—10 to 12 oz.

Points Open—8.25 volts (70° F.).

Points Close—7.0 volts.

For Regulator Adjustments at other temperatures see complete data in Technical Section

Contact Opening—.005 inch (minimum).

Core Gap—.045 inch (contacts closed).

LIGHTING

Switch—Delco-Remy, 480-Y.

Location—Behind instrument board. Lighting controlled by pull button on instrument panel.

Fuses—Two 20 amp. fuses (type 3A-20) mounted on switch back.

Foot Selector Switch—Delco-Remy 471-U or 471-T (with extended terminal).

Horn Relay—Delco-Remy, 266-TK.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2330;

PARK—55; INSTRUMENT—63; DOME—81; STOP—87; TAIL—63.

Engin { Bore 3-3/16
Strok 5

[illegible]

Starting Capacity—175 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—6.3.
Lighting Capacity—7.5 amps. for 20 hours (150 amp. hour).
Box Length, 13; width, 7; height, 9-3/16 inches.

Connection to Engine- Bendix Drive, Type A-1729.
Running Free- 65 amps at 5½ volts, 5300 R.P.M.
Cranking Engine—120 amps. at 5.3 volts.
Engine Cranking Speed—120 R.P.M.
Stall Data (on car)—380 amps. at 3.9 volts.
Lock Torque (for test bench use)- 16½ pound-feet, 640 amps. at 3 volts.
Brush Spring Tension—42 to 53 oz. on each (new brushes).
Solenoid Starting Switch—Auto-Lite, SS-4001 connected in parallel with "Startix" type F, Red Seal Automatic Starting Switch and Anti-Stall Device.
Armature- Auto-Lite, MAW-2090.

Breakers—Contact separation .020 inch.
Cam Angles—Points closed 34 degrees; open 56 degrees (each breaker separately). Primary circuit closed 34 degrees; open 11 degrees (with both breakers operating).
Contact Spring Tension—19 to 23 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.
Timing—IMPORTANT! Three types of cylinder heads are used on eight cylinder Packard engines, each head requiring a different ignition setting. Slowly turn engine until No. 1 piston is coming up on compression stroke. **LOW COMPRESSION** head, stop when 8th graduation **STANDARD** head when 6th graduation, and **HIGH COMPRESSION** head when 4th graduation before mark "DC" on vibration dampener; is under pointer on timing case. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
Spark Plugs—14-MM (AC type K-7); Gap .028 to .030 inch.
Firing Order—1-6-2-5-8-3-7-4.
Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
440	220	Start
1060	530	2
2010	1005	5
2970	1485	8
3600 (Max.)	1800	10

Ignition Coil--Delco-Remy, 539-K.
Ignition Switch and Cable--Delco-Remy, 430-L.

O-D Test 482 **Rotation, L. H., Com. End**
Auto-Lite—Owen-Dyneto, Type CO-1300 (Air Cooled)
IMPORTANT NOTL. The drive end generator bearing is part of engine Do not
 run unit in test bench until special Dyneto bearing is attached.

Performance Data—Gen. cold.			Charge regulator points closed.		
Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	480	6.5	20	920	7.6
4	520	6.75	24	1040	7.8
8	580	6.95	28	1200	8.
12	620	7.15	30	1880 (Max.)	8.3
16	810	7.4			

Motoring Freely—16 to 18 amps. at 6 volts.
Max. Stall Current—30 amps. at 5.9 volts.
Field Test—3.5 to 3.7 amps. at 6 volts across field coils in
Field Fuse—5 amps. (type 1A-5) mounted on charge relay.
Brush Spring Tension—20 to 22 oz. on each (new brushes).
Armature—Owen-Dyneto, 23865.
Third Brush Adjustment—Not necessary to loosen cover. Third
 brush position changed by turning adjusting screw in commu-
 tator end frame.

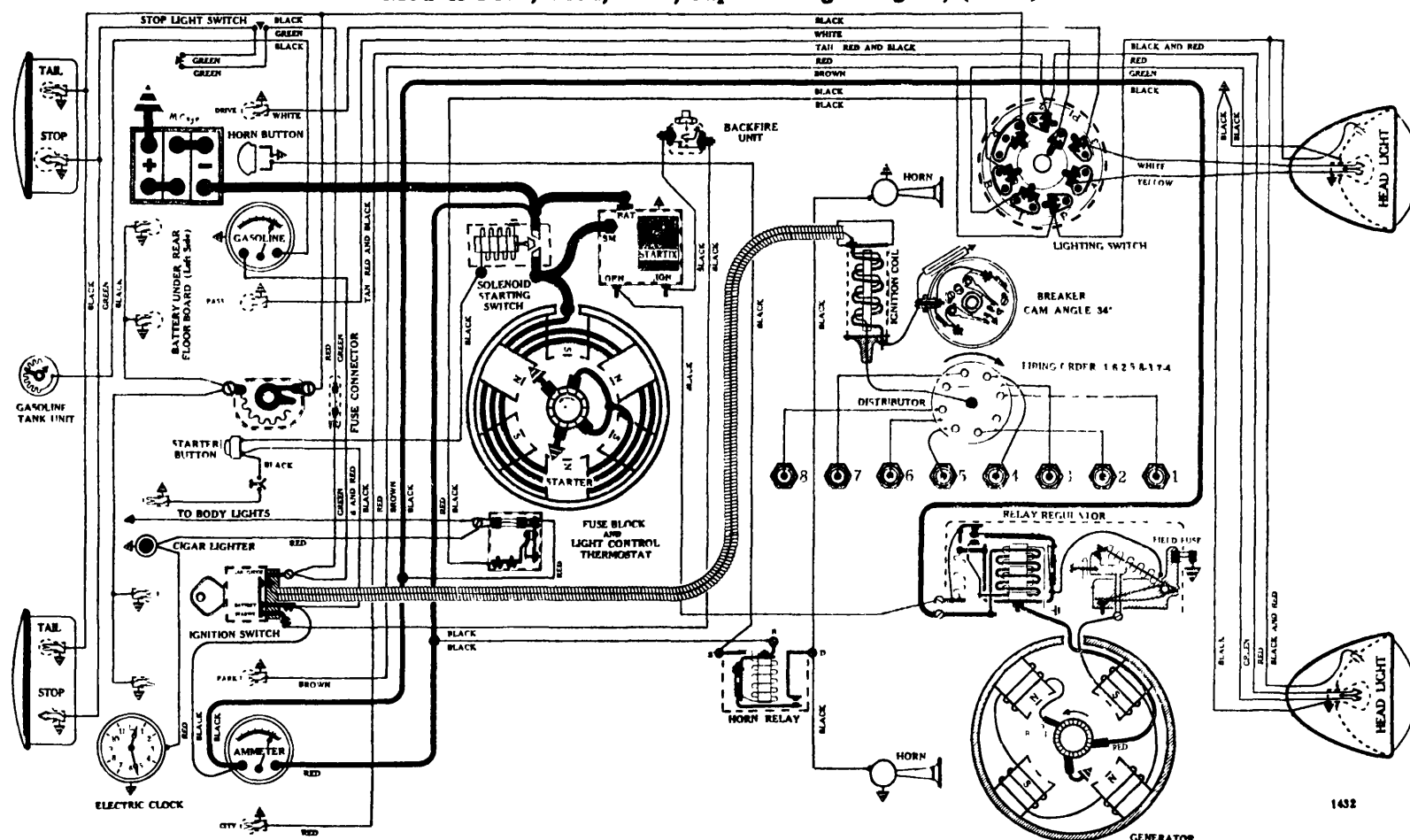
Relay Closes—6.7 to 6.9 volts.
Opens—0 to 3 amps. discharge.
Contact Gap—.030 inch.
Core Gap—.010 inch, contacts closed.

Switch—R.B.M. Mfg. Co., Type 1402.
Location—Foot of steering column.
Fuses—Combination thermostatic relay and fuse block (Delco-Remy, 1050-W) mounted on steering post bracket behind instrument board. Relay in lighting circuits. Single 20 amp. fuse (type 5A-20) in cigar lighter and body light circuits. Single 20 amp. fuse (type 3A-20) in fuse connector behind instrument board on wire to stop light switch.
Lamps—Refer to "Lamp Data" in Technical Section. **HEAD**—2330; **PARK**—55; **INSTRUMENT**—63; **DOME**—81; **INDICATOR**—51; **STOP**—87; **TAIL**—63.

PACKARD

Models 1403, 1404, 1405, Super Straight Eights, (1936)

Engine {Bor 3-1/2
Str k 5



BATTERY

Prest-O-Lite, H4-21, 6 volts. Positive Terminal Grounded

Starting Capacity—175 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—6.3.
Lighting Capacity—7.5 amps. for 20 hours (150 amp. hour).
Box—Length, 13; width, 7; height, 9-3/16 inches.

STARTER

O-D Test 352 Rotation, L. H., Com. End

Auto-Lite - Owen-Dyneto, Type DN-1298

Connection to Engine—Bendix Drive, Type RCD10FXTD.

Running Free—50 amps. at 6 volts, 3000 R.P.M.

Cranking Engine—135 amps. at 5.3 volts.

Engine Cranking Speed—120 R.P.M.

Stall Data (on car)—385 amps. at 3.9 volts.

Lock Torque (for test bench use)—39 pound-feet, 810 amps. at 3.5 volts.

Brush Spring Tension—26 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4001-A connected in parallel with "Startix" type F, Red Seal Automatic Starting Switch and Anti-Stall Device.

Armature—Owen-Dyneto, 13409.

IGNITION

D-R Test 1066 Rotation, R. H., Top View

Delco-Remy, 662-T

Group 62

Breakers—Contact separation .020 inch.

Cam Angles—Points closed 34 degrees; open 56 degrees (each breaker separately). Primary circuit closed 34 degrees; open 11 degrees (with both breakers operating).

Contact Spring Tension—19 to 23 oz. on each.

Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.

Timing—IMPORTANT! Three types of cylinder heads are used on eight cylinder Packard engines, each head requiring a different ignition setting. Slowly turn engine until No. 1 piston is coming up on compression stroke. LOW COMPRESSION head, stop when 8th graduation, STANDARD head when 6th graduation, and HIGH COMPRESSION head when 4th graduation before mark "DC" on vibration dampener is under pointer on timing case. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—14-MM (AC type K-7); Gap .028 to .030 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
440	220		2
1060	530		5
2010	1005		8
2970	1485		10
3600 (Max.)	1800		

Ignition Coil—Delco-Remy, 539-K.

Ignition Switch and Cable—Delco-Remy, 430-L.

GENERATOR

O-D Test 482

Rotation, L. H., Com. End

Auto-Lite - Owen-Dyneto, Type CO-1300 (Air Cooled)

IMPORTANT NOTE The drive end generator bearing is part of engine. Do not run unit in test bench until special Dyneto bearing is attached.

Performance Data—Gen. cold. Charge regulator points closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	480	6.5	20	920	7.6
4	520	6.75	24	1040	7.8
8	580	6.95	28	1200	8.
12	620	7.15	30	1880 (Max.)	8.3
16	810	7.4			

Motoring Freely—16 to 18 amps. at 6 volts.

Max. Stall Current—30 amps. at 5.9 volts.

Field Test—3.5 to 3.7 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5) mounted on charge regulator.

Brush Spring Tension—20 to 22 oz. on each (new brushes).

Armature—Owen-Dyneto, 23865.

Third Brush Adjustment—Not necessary to loosen cover band.

Third brush position changed by turning adjusting screw in commutator end frame.

CHARGE REGULATOR AND RELAY

Owen-Dyneto, Type 40210

Relay Closes—6.7 to 6.9 volts.

Opens—0 to 3 amps. discharge.

Contact Gap—.030 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—R.B.M. Mfg. Co., Type 1402.

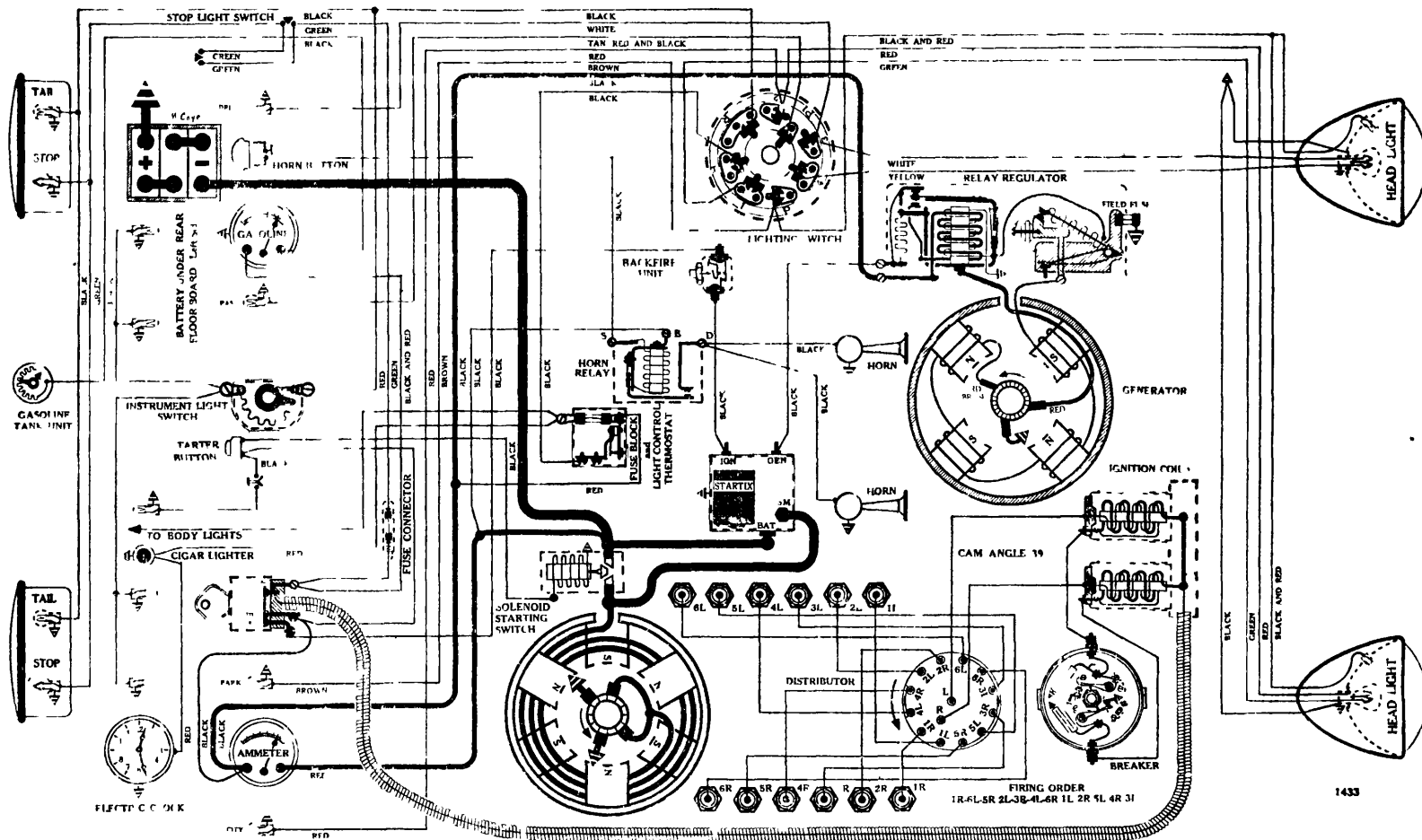
Location—Foot of steering column.

Fuses—Combination thermostatic relay and fuse block (Delco-Remy, 1050-W) mounted on steering post bracket behind instrument board. Relay in lighting circuits. Single 20 amp. fuse (type 5A-20) in cigar lighter and body light circuits. Single 20 amps. fuse (type 3A-20) in fuse connector behind instrument board on wire to stop light switch.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2330; PARK—55; INSTRUMENT—63; DOME—81; INDICATOR—51; STOP—87; TAIL—63.

PACKARD

Mod ls 1407 and 1408, 67 Degree "V e" 12, (1936)

Engin {B re 3-7/16
Strok 4-1/4

BATTERY

Prest-O-Lite, H4-21, 6 volts. Positive Terminal Grounded
 Starting Capacity—175 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—6.3.
 Lighting Capacity—7.5 amps. for 20 hours (150 amp. hour).
 Box—Length, 13; width, 7; height, 9-3/16 inches.

STARTER

O-D Test 352 Rotation, L. H., Com. End
 Auto-Lite - Owen-Dyneto, Type DN-1299
 Connection to Engine—Bendix Drive, Type RCD10FXTD.
 Running Free—50 amps. at 6 volts, 3000 R.P.M.
 Cranking Engine—135 amps. at 5.3 volts.
 Engine Cranking Speed—120 R.P.M.
 Stall Data (on car)—385 amps. at 3.9 volts.
 Lock Torque (for test bench use)—39 pound-feet, 810 amps. at 3.5 volts.
 Brush Spring Tension—26 to 28 oz. on each (new brushes).
 Solenoid Starting Switch—Auto-Lite, SS-4001-A connected in parallel with "Startix" type F, Red Seal Automatic Starting Switch and Anti-Stall Device.
 Armature—Owen-Dyneto, 13409.

IGNITION

A-L Test 407 Rotation, L. H., Top View
 Auto-Lite, IGO-4002-A
 (Full Automatic Spark Advance)
 Breakers—Contact separation .018 inch on each.
 Cam Angles—Points closed 39 degrees; open 21 degrees.
 Contact Spring Tension—20 to 22 oz. on each.
 Synchronizing—Unequal intervals of 33½-26½-33½, etc., degrees between interruptions.
 Timing—IMPORTANT! Three types of cylinder heads are used on twelve cylinder Packard engines, each head requiring a different ignition setting. Slowly turn engine until No. 1 piston is coming up on compression stroke. LOW COMPRESSION and STANDARD heads, stop when 8th graduation, HIGH COMPRESSION head when 4th graduation before mark "DC" on vibration dampener is under pointer on timing case. With rotor under No. 1R Dist Cap Terminal stationary set of breaker points should just open.
 Spark Plugs—14-MM (AC type K-7); Gap .028 to .030 inch.
 Firing Order—1R-6L-5R-2L-3R-4L-6R-1L-2R-5L-4R-3L.
 Automatic Advance—8 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist)
600	300	Start
1050	525	2
1500	750	4
1950	975	6
2400 (Max.)	1200	8

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CE-4022 or CE-4023 (Custom built cars).
 Ign. Coil Only—A-L, CE-1203 (all models).
 Ign. Switch and Cable Assembly Less Lock—A-L, CE-207; CE-210 (Custom built cars).

GENERATOR

O-D Test 482 Rotation, L. H., Com. End
 Auto-Lite - Owen-Dyneto, Type CO-1304 (Belt Drive, Air Cooled)
 Performance Data—Gen. cold. Charge regulator points closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	480	6.5	20	920	7.6
4	520	6.75	24	1040	7.8
8	580	6.95	28	1200	8.
12	620	7.15	30	1880 (Max.)	8.3
16	810	7.4			

Votoring Freely—16 to 18 amps. at 6 volts.
 Max. Stall Current—30 amps. at 5.9 volts.
 Field Test—3.5 to 3.7 amps. at 6 volts across field coils in series.
 Field Fuse—5 amps. (type 1A-5) mounted on charge regulator.
 Brush Spring Tension—20 to 22 oz. on each (new brushes).
 Armature—Owen-Dyneto, 23709.
 Third Brush Adjustment—Not necessary to loosen cover band.
 Third brush position changed by turning adjusting screw in commutator end frame.

CHARGE REGULATOR AND RELAY

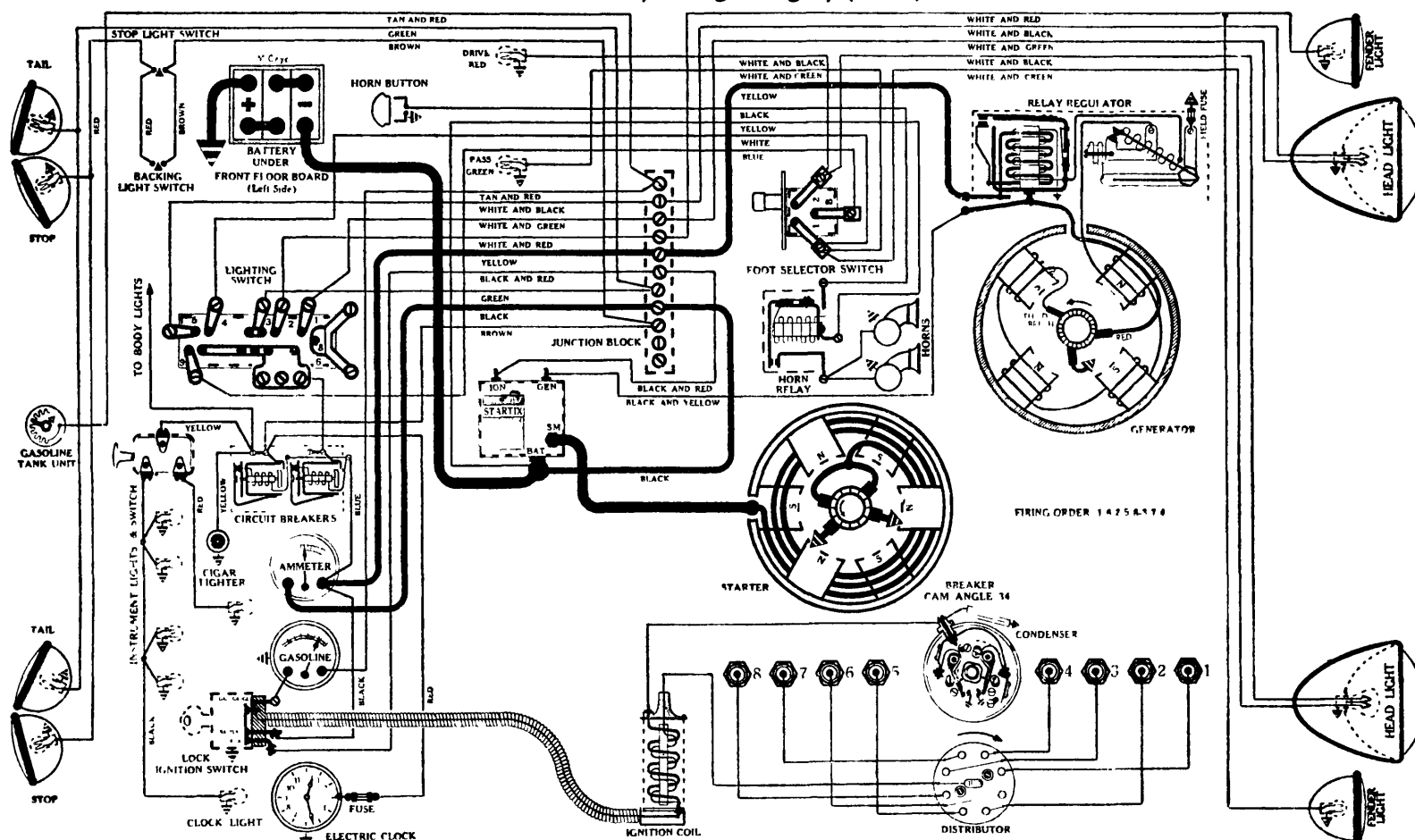
Owen-Dyneto, Type 40210
 Relay Closes—6.7 to 6.9 volts.
 Opens—0 to 3 amps. discharge
 Contact Gap—.030 inch.
 Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—R.B.M. Mfg. Co., Type 1402.
 Location—Foot of steering column.
 Fuses—Combination thermostatic relay and fuse block (Delco-Remy, 1050-W) mounted on steering post bracket behind instrument board. Relay in lighting circuits. Single 20 amp. fuse (type 5A-20) in cigar lighter and body light circuits. Single 20 amps. fuse (type 3A-20) in fuse connector behind instrument board on wire to stop light switch.
 Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2330; PARK—55; INSTRUMENT—63; DOME—81; INDICATOR—51; STOP—87; TAIL—68.

PIERCE - ARROW

Mod 1 1601, Straight Eight, (1936)

 Engin { B re 3-1/2
 Strok 5


BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded
 Starting Capacity—160 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—5.4.
 Lighting Capacity—6.8 amps. for 20 hours (136 amp. hour).
 Box—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

O-D Test 353 Rotation, L. H., Com. End
 Auto-Lite - Owen-Dyneto, Type DI-1314
 Connection to Engine—Bendix Drive, Type RCD11FXT-10.
 Running Free—60 amps. at 6 volts, 4500 R.P.M.
 Cranking Engine—150 amps. at 5.4 volts.
 Engine Cranking Speed—102 R.P.M.
 Stall Data (on car)—450 amps. at 4.2 volts.
 Lock Torque (for test bench use)—29 pound-feet, 730 amps. at 3.6 volts.
 Brush Spring Tension—56 to 60 oz. on each (new brushes).
 Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.
 Armature—Owen-Dyneto, 16437.

IGNITION

D-R Test 1005 Rotation, R. H., Top View Group 62
 Delco-Remy, 662-J
 (Semi-Automatic Spark Advance)
 Breakers—Contact separation .020 inch.
 Cam Angles—Points closed 34 degrees; open 56 degrees (each breaker separately). Primary circuit closed 34 degrees; open 11 degrees (with both breakers operating).
 Contact Spring Tension—17 to 21 oz. on each.
 Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.
 Timing—IMPORTANT! Time ignition in full advance position. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "IGN 18" (found 2 degrees ahead of "U.D.C. 18") registers with pointer at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal STATIONARY set of breaker points should just open.
 Spark Plugs—14-MM (Champion type J-6); Gap .030 inch.
 Firing Order—1-6-2-5-8-3-7-4.
 Manual Advance—16½ degrees (Distributor).
 Automatic Advance—9 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
300	150	Start
920	460	2
1550	775	4
2480	1240	7
3100 (Max.)	1550	9

Ignition Coil—Delco-Remy, 539-K.
 Ignition Switch and Cable—Delco-Remy, 430-U.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite - Owen-Dyneto, Type CO-1309 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Charge regulator points closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	480	6.5	20	920	7.6
4	520	6.75	24	1040	7.8
8	580	6.95	28	1200	8.
12	620	7.15	30	1880 (Max.)	8.3
16	810	7.4			

Motoring Freely—16 to 18 amps. at 6 volts.
 Max. Stall Current—30 amps. at 5.9 volts.
 Field Test—3.5 to 3.7 amps. at 6 volts across field coils in series.
 Field Fuse—5 amps. (type 1A-5) mounted on charge regulator.
 Brush Spring Tension—20 to 22 oz. on each (new brushes).
 Armature—Owen-Dyneto, 23691.
 Third Brush Adjustment—Not necessary to loosen cover band.
 Third brush position changed by turning adjusting screw in commutator end frame.

RELAY-REGULATOR

Owen-Dyneto, Type 40300

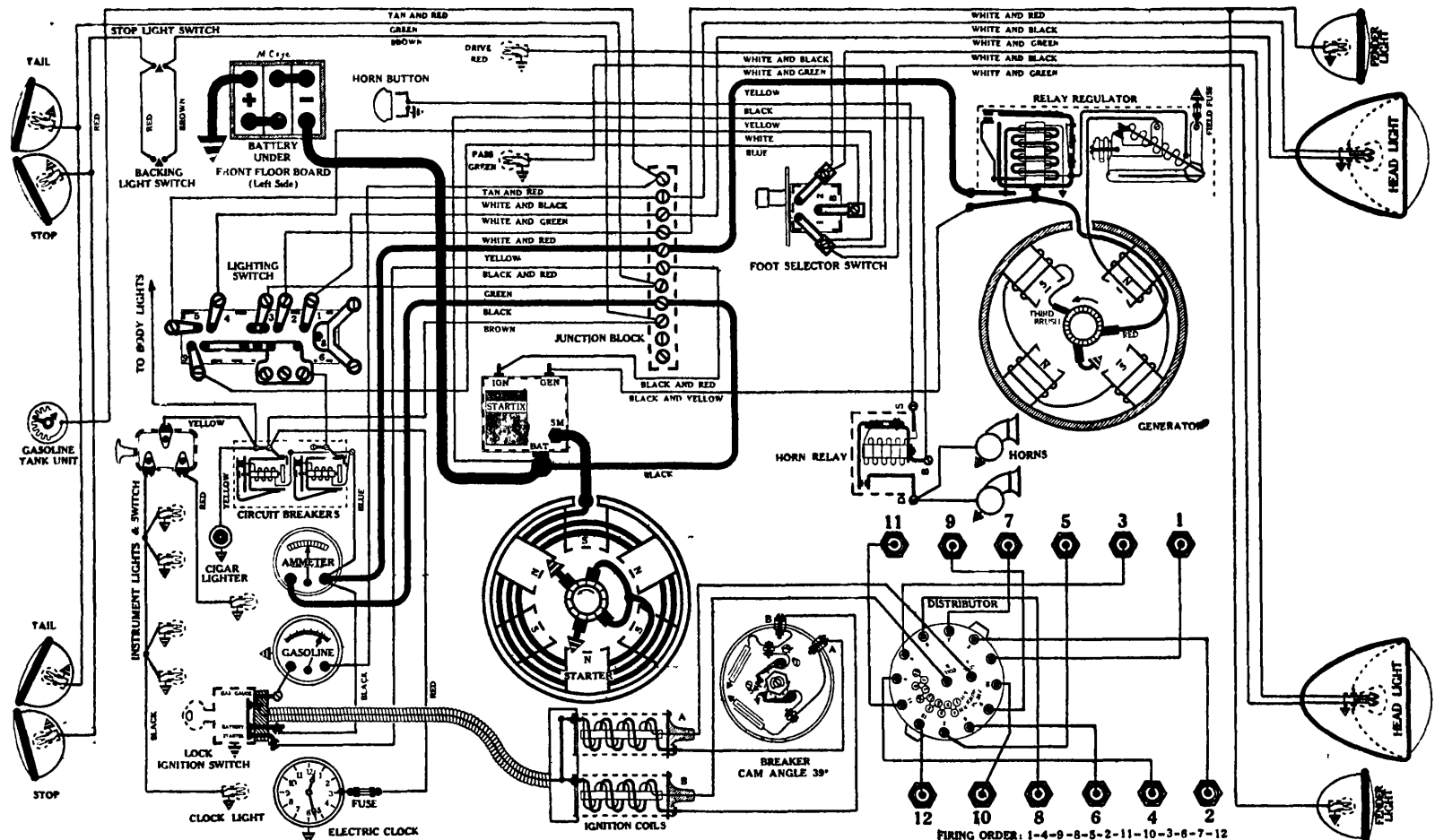
Relay Closes—6.7 to 6.9 volts.
 Opens—0 to 3 amps. discharge.
 Contact Gap—.030 inch.
 Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 479-M.
 Location—Behind instrument board.
 Dash Light Switch—Delco-Remy, 1411.
 Vibrating Circuit Breakers—Delco-Remy, 410-N. Starts to operate at 35 to 40 amps. Limits current to from 5 to 22 amps. Point opening .012 to .030 inch. Spring tension 5 oz. minimum (at brass button).
 Horn Relay—Delco-Remy, 266-TK.
 Foot Selector Switch—Delco-Remy, 471-Z.
 Lamps—Refer to "Lamp Data" in Technical Section. FENDER-HEAD—2330; PARK—55; AUXILIARY—1323; STOP AND BACKING—1129; LICENSE PLATE—63; AUXILIARY PILOT—64; INSTRUMENT PANEL—55; CORNER—81; DOME—81; RUMBLE SEAT OR REAR COMPARTMENT—63; SMOKER—81; TAIL—81.

PIERCE - ARROW

Models 1602 and 1603, 80 Degree "Vee" 12, (1936)

 Engin { Bore 3-1/2
 Stroke 4


BATTERY

Willard, WH-5-19, 6 volts. Positive Terminal Grounded
 Starting Capacity—180 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—6.6.
 Lighting Capacity—7.6 amps. for 20 hours (153 amp. hour).
 Box—Length, 13; width, 7-1/16; height, 9 3/4 inches.

STARTER

O-D Test 353 Rotation, L. H., Com. End
 Auto-Lite - Owen-Dyneto, Type DI-1313
 Connection to Engine—Bendix Drive, Type RCD11FXT-10.
 Running Free—60 amps. at 6 volts, 4500 R.P.M.
 Cranking Engine—160 amps. at 5.4 volts.
 Engine Cranking Speed—114 R.P.M.
 Stall Data (on car)—460 amps. at 4.1 volts.
 Lock Torque (for test bench use)—29 pound-feet, 730 amps. at 3.6 volts.
 Brush Spring Tension—56 to 60 oz. on each (new brushes).
 Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.
 Armature Owen-Dyneto, 16437.

IGNITION

D-R Test 1010 Rotation, R. H., Top View
 Delco-Remy, 4105
 (Semi-Automatic Spark Advance)
 Breakers—Contact separation .018 inch on each.
 Cam Angles—Points closed 39 degrees; open 21 degrees.
 Contact Spring Tension—17 to 21 oz. on each.
 Synchronizing—Movable points (which fire right bank) open 20 degrees after stationary. Unequal intervals of 20-40-20, etc., degrees between interruptions.
 Timing—IMPORTANT! Time ignition to full advance position. Slowly turn engine until No. 1 piston (left bank) is coming up on compression stroke. Stop when flywheel mark "Ign 1" (which is 3 degrees ahead of mark "UDC-1") is directly in line with pointer at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
 Spark Plugs—14-MM (Champion type J-6); Gap .030 inch.
 Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.
 NOTE: All odd cylinder numbers on left bank. No. 1 nearest radiator. All even numbers on right bank (see diagram).
 Manual Advance—16 1/2 degrees (Distributor).
 Automatic Advance—7 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)	Start
500	250		1
800	400		2
1140	570		4
1800	900		7
2800 (Max.)	1400		

Ignition Coils—Delco-Remy, 553-E.
 Ignition Switch and Cable—Delco-Remy, 430-T.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite - Owen-Dyneto, Type CO-1309 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Charge regulator points closed.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	480	6.5	20	920	7.6
4	520	6.75	24	1040	7.8
8	580	6.95	28	1200	8.
12	620	7.15	30	1880 (Max.)	8.3
16	810	7.4			

Motoring Freely—16 to 18 amps. at 6 volts.

Max. Stall Current—30 amps. at 5.9 volts.

Field Test—3.5 to 3.7 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5) mounted on charge regulator.

Brush Spring Tension—20 to 22 oz. on each (new brushes).

Armature—Owen-Dyneto, 23691.

Third Brush Adjustment—Not necessary to loosen cover band.

Third brush position changed by turning adjusting screw in commutator end frame.

RELAY-REGULATOR

Owen-Dyneto, Type 40300

Relay Closes—6.7 to 6.9 volts.

Opens—0 to 3 amps. discharge.

Contact Gap—.030 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 479-M.

Location—Behind instrument board

Dash Light Switch—Delco-Remy, 1411.

Vibrating Circuit Breakers—Delco-Remy, 410-N. Starts to operate at 35 to 40 amps. Limits current to from 5 to 22 amps. Point opening .012 to .030 inch. Spring tension 5 oz. minimum (at brass button).

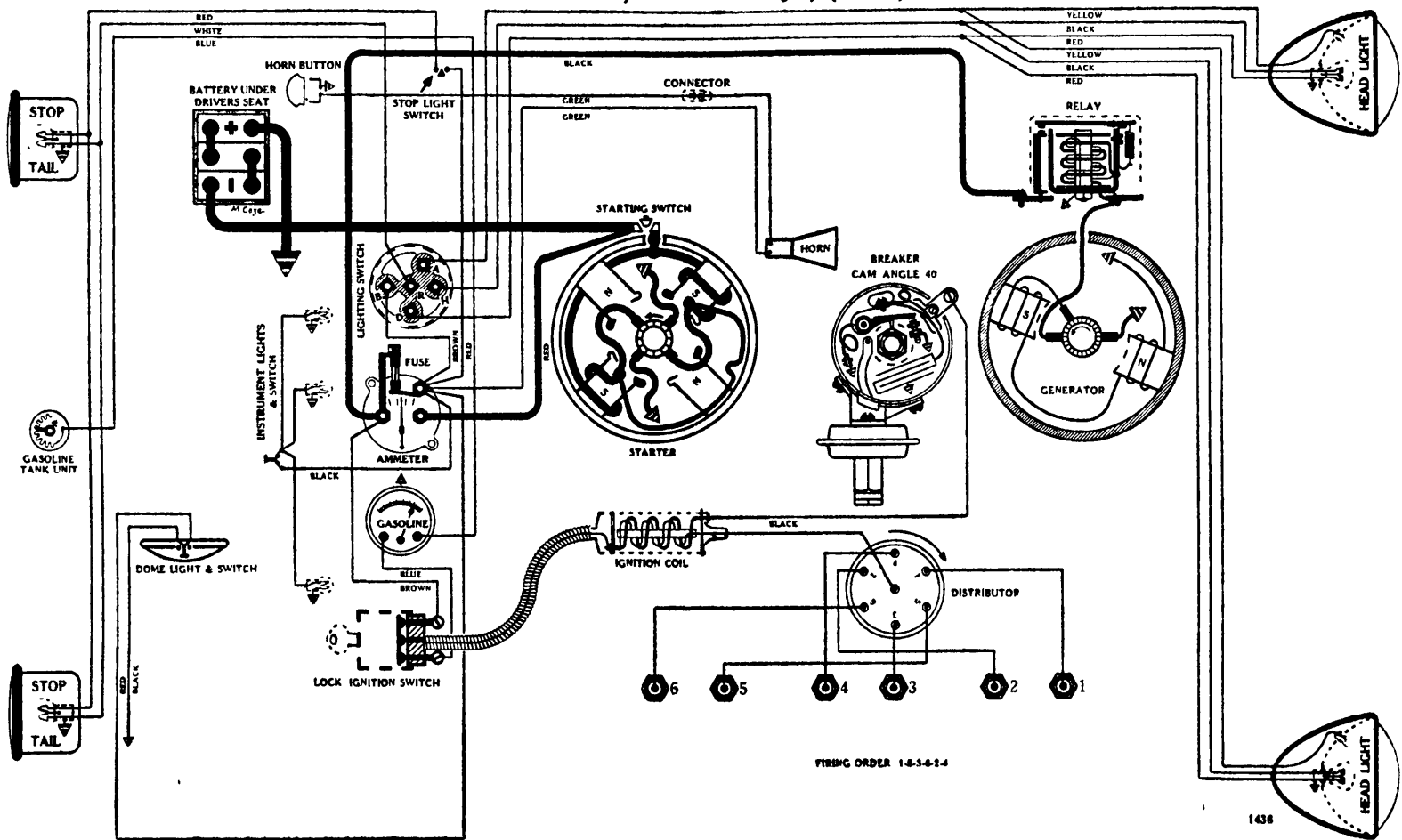
Horn Relay—Delco-Remy, 266-TK.

Foot Selector Switch—Delco-Remy, 471-Z.

Lamps—Refer to "Lamp Data" in Technical Section. FENDER-HEAD—2330; PARK—55; AUXILIARY—1323; STOP AND BACKING—1129; LICENSE PLATE—63; AUXILIARY PILOT—64; INSTRUMENT PANEL—55; CORNER—81; DOME—81; RUMBLE SEAT OR REAR COMPARTMENT—63; SMOKER—81; TAIL—81.

PLYMOUTH
Mod 1 P-1, Busin ss 6 cyl., (1936)

Engin {Bor 3-1/8
Str k 4-3/8



BATTERY

Willard, WHT-1-90, 6 volts. Positive Terminal Grounded
Starting Capacity—114 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.
Lighting Capacity—4.5 amps. for 20 hours (90 amp. hour).
Box—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

A-L Test CU-417 Rotation, L. H., Com. End
Auto-Lite, MAW-4009
For Data see page 1437 (Model P-2, 1936).

IGNITION

A-L Tests: Rotation, R. H., Top View
418 (IGS-4003-1 and A-1) Auto-Lite, IGS-4003-1 or
480 (IGS-4003-B-1) IGS-4403-A-1 or IGS-4003-B-1
(All three Distributors have a Full Automatic Spark Advance, in conjunction with the Auto-Lite IGS-1023-CS Vacuum Advance Unit, which controls position of Breaker Plate)
Breaker—Contact separation .020 inch.
Cam Angles—Points closed 40 degrees; open 20 degrees (by actual tests).
Cam Angles—Points closed 38 degrees; open 22 degrees (official A-L data).
Contact Spring Tension—16 to 20 oz.
Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "zero" mark on fan pulley (which is exact T.D.C.) has moved 4 graduations past the pointer on gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
Spark Plugs—14-MM (AC type K-9); Gap .025 inch.
Firing Order—1-5-3-6-2-4.
Vacuum Advance Unit (Auto-Lite IGS-1023-CS; test No. CU-456, used on all three distributors)—10 degrees (Dist. advance). Starts with vacuum of 5 inches mercury. Requires vacuum of 14 inches for full travel.
Automatic Advance—11 degrees (Distributor), on all three units.
NOTE. Automatic advance characteristics of the IGS 4003 1 and IGS 4003 A-1 Distributors are the same, and as follows:
Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist.)
700 350 Start
800 (Intermediate) 400 3
1400 700 5
2300 1150 8
3200 (Max.) 1600 11

The following is the Spark Advance Table for the IGS-4003-B-1 Distributor.

700	350	Start
800 (Intermediate)	400	3
1530	765	5
2610	1305	8
3700 (Max.)	1850	11

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4629.
Ign. Coil Only—A-L, IG-3224-S.
Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-BYS.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GBM-4603-B-1 (Belt Drive, Air Cooled)
Performance Data—Gen. cold.
Amps. R.P.M. Volts Amps. R.P.M. Volts
0 725 6.5 12 1350 7.5
4 900 6.8 16 1740 7.8
8 1125 7.2 18 2200 (Max.) 8.0

Motoring Freely—5.3 to 5.8 amps. at 6 volts.
Max Stall Current—24 to 26 amps. at 5½ volts.
Field Test—3.8 to 4.2 amps. at 6 volts across field coils in series.
Brush Spring Tension—36 oz. Max. on each (new brushes).
Armature—Auto-Lite, GBM-2006-F.
Third Brush Adjustment—Loosen cover band Shift third brush by hand Mounting plate held in any position by friction clamp washers.

RELAY

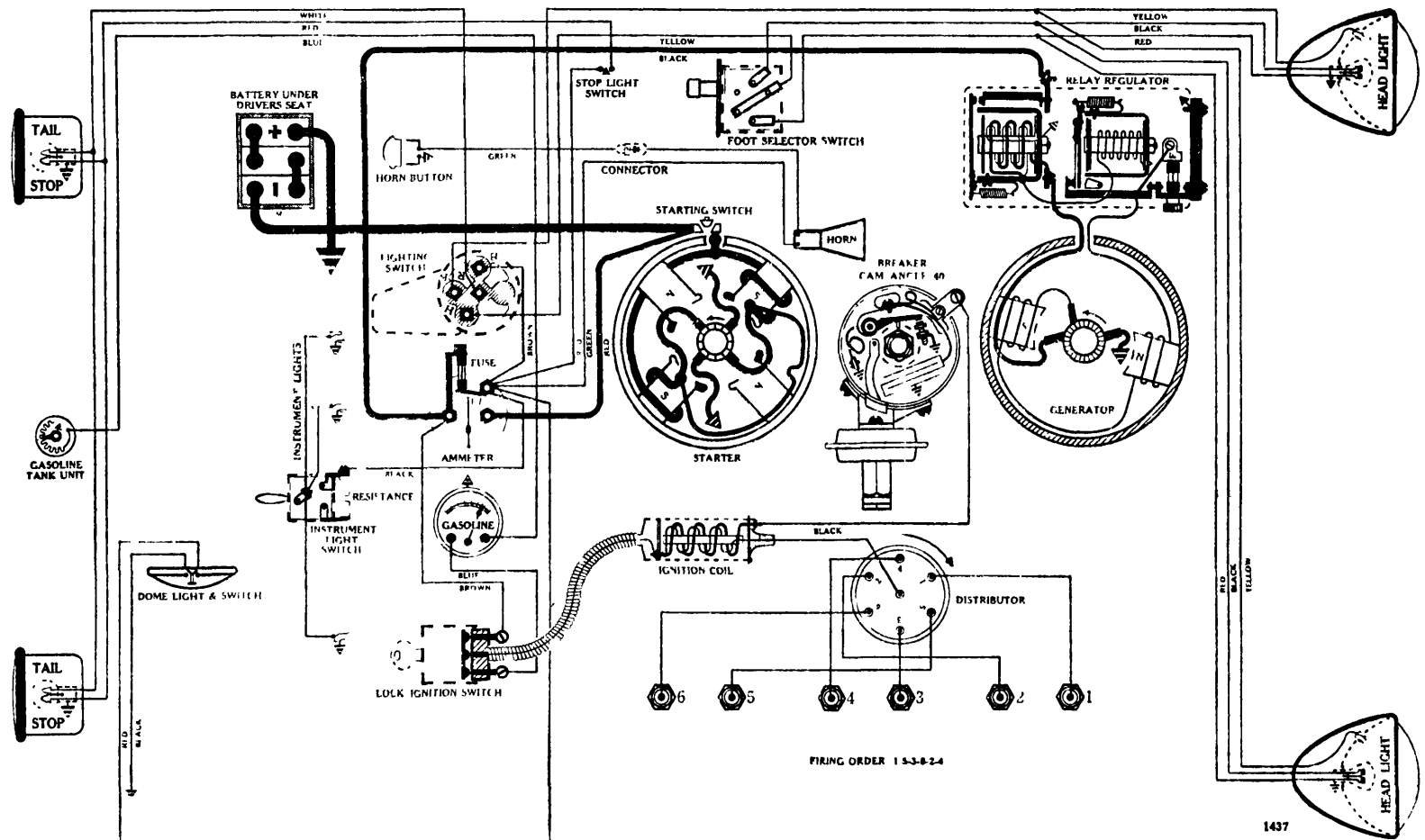
Auto-Lite, CB-4014
Closes—6¾ to 7½ volts.
Opens—½ to 2½ amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Douglas, No. 5436 (as shown) or 5374 (see Plymouth P-2, 1936).
Location—Behind instrument board.
Fuses—Single 20 amp. fuse (type 3A-20) in special bayonet type fuse holder attached to back of ammeter.
Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2331 (Bar Filament); PARK—55; INSTRUMENT—55; DOME—87; IGNITION SWITCH LIGHT—55; STOP AND TAIL—1158.

PLYMOUTH

Model P-2, DeLux 6 cyl., (1936)

 Engin {Bor 3-1/8
 {Strok 4-3/8


BATTERY

Willard, WT-1-15, 6 volts. Positive Terminal Grounded
 Starting Capacity—117 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1.
 Lighting Capacity—4.5 amps. for 20 hours (90 amp. hour).
 Box—Length, 9-1/16; width, 7-1/16; height, 8 3/8 inches.

STARTER

A-L Test CU-417 Rotation, L. H., Com. End
 Auto-Lite, MAW-4009

Connection to Engine—Mechanical pinion shift incorporating an over running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Auto-Lite, MAD-3099.

Running Free 65 amps. at 5 1/2 volts, 4900 R.P.M.

Cranking Engine—150 amps. at 5.4 volts.

Engine Cranking Speed—156 R.P.M.

Stall Data (on Car)—400 amps. at 3.3 volts.

Lock Torque (for test bench use)—11 1/2 pound-feet, 505 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-2677-A.

Armature Auto-Lite, MAW-2030.

IGNITION

A-L Tests:
 418 (IGS-4003-1 and A-1)
 480 (IGS-4003-B-1)

Rotation, R. H., Top View
 Auto-Lite, IGS-4003-1 or
 IGS-4003-A-1 or IGS-4003-B-1

(All three Distributors have a Full Automatic Spark Advance, in conjunction with the Auto-Lite IGS-1023-CS Vacuum Advance Unit, which controls position of Breaker Plate)

Breaker - Contact separation .020 inch.

Cam Angles Points closed 40 degrees; open 20 degrees (by actual tests).

Cam Angles Points closed 38 degrees; open 22 degrees (official A-L data).

Contact Spring Tension—16 to 20 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "zero" mark on fan pulley (which is exact T.D.C.) has moved 4 graduations past the pointer on gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-9); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance Unit (Auto-Lite IGS-1023-CS; test No. CU-456, used on all three distributors)—10 degrees (Dist. advance). Starts with vacuum of 5 inches mercury. Requires vacuum of 14 inches for full travel.

Automatic Advance—11 degrees (Distributor), on all three units.

NOTE: Automatic advance characteristics of the IGS-4003-1 and IGS-4003-A-1 Distributors are the same. For advance characteristics of all three units see page 1436 (Model P 1, 1936)

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4629.

Ign. Coil Only—A-L, IG-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-BYS.

GENERATOR

Rotation, L. H., Com. End
 Auto-Lite, GAR-4608-E-5

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	12	1275	7.4
4	875	6.8	16	1600	7.8
8	1075	7.	21	2400 (Max.)	8.1

Motoring Freely—5 to 5 1/2 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.

Field Fuse—5 amp. (type 1A-5) in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116-F.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4301-A with TC-51G Resistance Unit
 A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator.

Cut-Out Relay—Closes—6.5 to 7.3 volts.

Opens—0 to 3 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

Regulator—

A-L Test 119 Points Open—8.25 volts (70° F.).

Points Close—7.0 volts.

For Regulator Adjustments at other temperatures see complete data in Technical Section

Contact Opening—.005 inch (minimum).

Core Gap—.045 inch (contacts closed).

LIGHTING

Switch—Douglas, No. 5374.

Location—Behind instrument board.

Fuses—Single 20 amp. fuse (type 3A-20) in special bayonet type fuse holder attached to back of ammeter.

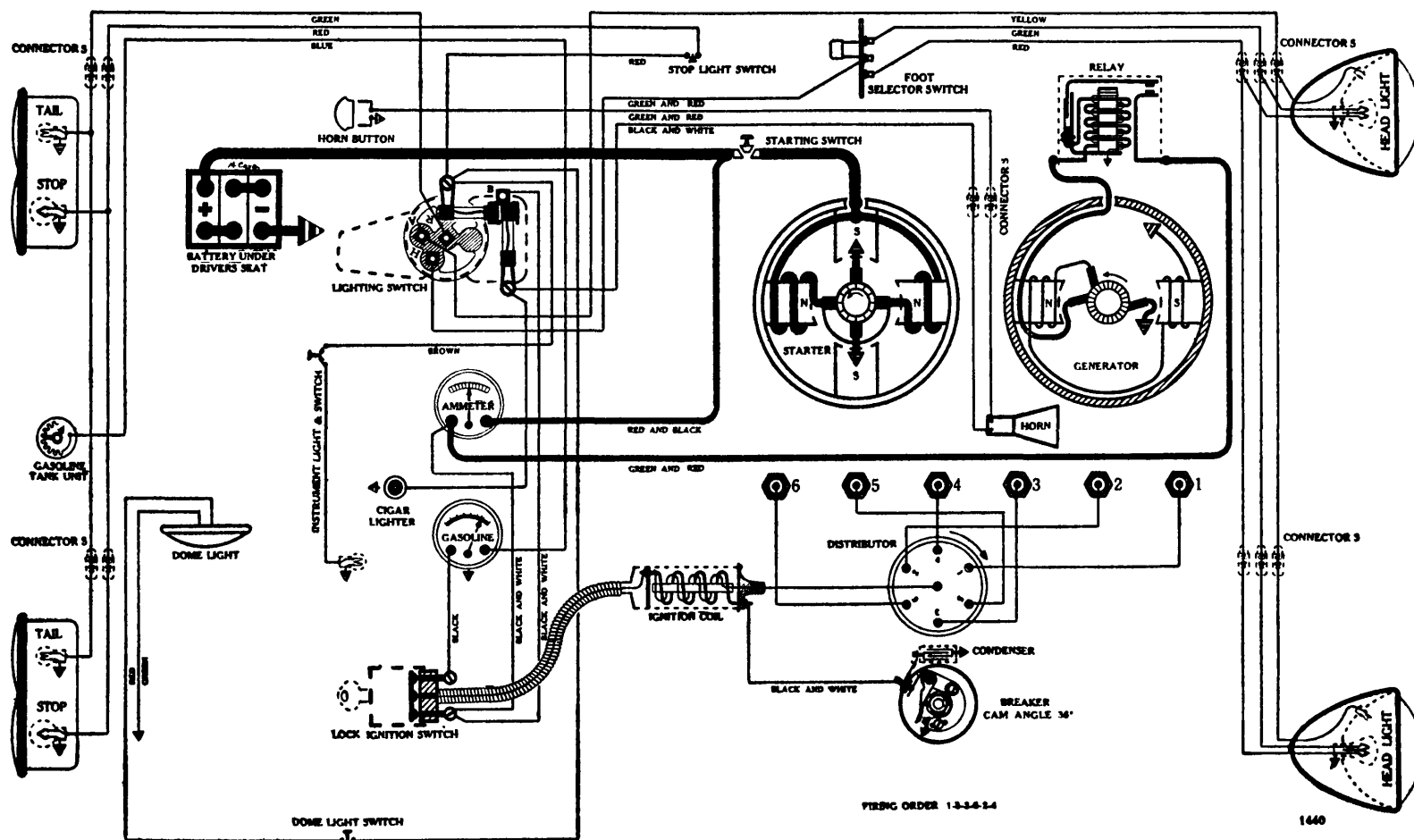
Horn Relay—Delco-Remy, 266-TK (if used).

Foot Selector Switch—Clum No. 9654.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2331 (Bar Filament); PARK—55; INSTRUMENT—55; DOME—87; IGNITION SWITCH LIGHT—55; STOP AND TAIL—1158.

REO

Model 6-D, Flying Cloud, 6 cyl., (1936)

 Engin {Bor 3-3/8
 {Strok 4-1/4


BATTERY

Willard, WH-1-13, 6 volts. Negative Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1.

Lighting Capacity—5.1 amps. for 20 hours (102 amp. hour).

Box—Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

D-R Test 368

Rotation, L. H., Com. End

Group 46

Delco-Remy, 738-K

Connection to Engine—Bendix Drive, Type A-1718.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—80 amps. at 5.5 volts.

Engine Cranking Speed—132 R.P.M.

Stall Data (on Car)—380 amps. at 4 volts.

Lock Torque (for test bench use)—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 405-C (clutch pedal operated).

Armature—Delco-Remy, 1847432.

IGNITION

D-R Test 124

Rotation, R. H., Top View

Group 82

Delco-Remy, 623-D

(Full Automatic Spark Advance in conjunction with Delco-Remy 681-D Vacuum Control Unit, which turns the entire Distributor)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 36 degrees; open 24 degrees.

Contact Spring Tension—17 to 21 oz.

Timing—IMPORTANT! There is no timing mark on the flywheel. Make a chalk mark on flywheel 1/2 inch ahead of flywheel mark "T D C". Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when chalk mark registers with reference line on flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type 7); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance Unit (Delco-Remy 681-D; test No. 669)—5 1/2 degrees (Dist advance). Starts with vacuum of 7 inches mercury. Requires vacuum of from 9 to 13 inches for full travel.

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.

Dist. R.P.M.

Degrees Advance (Dist.)

310

155

Start

690

345

2

1070

535

4

1450

725

6

1830

915

8

2200 (Max.)

1100

10

Ignition Coil—Delco-Remy, 536-G.

Ignition Switch and Cable—Delco-Remy, 435-C.

GENERATOR

D-R Test 278-A

Rotation, L. H., Com. End

Group 51

Delco-Remy, 937-Z (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	10	1020	7.5
2	760	6.7	14	1270	7.9
6	860	7.1	18	2000 (Max.)	8.3

Motoring Freely—3 1/2 to 4 amps. at 6 volts.

Max. Stall Current—23 to 25 amps. at 6 volts.

Field Test—3 1/2 amps. at 6 volts across field coils in series.

Brush Spring Tension—23 to 27 oz. on each (new brushes).

Armature—Delco-Remy, 1838448.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAY

Delco-Remy, 265-H

Closes—6 3/4 to 7 1/2 volts.

Opens—0 to 2 1/2 amps. discharge.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

LIGHTING

Switch—Douglas, No. 5435.

Location—Behind instrument board.

Fuses—Two 20 amp. fuses (type 3A-20) mounted on switch back.

Horn Relay—Delco-Remy, 266-T (if used).

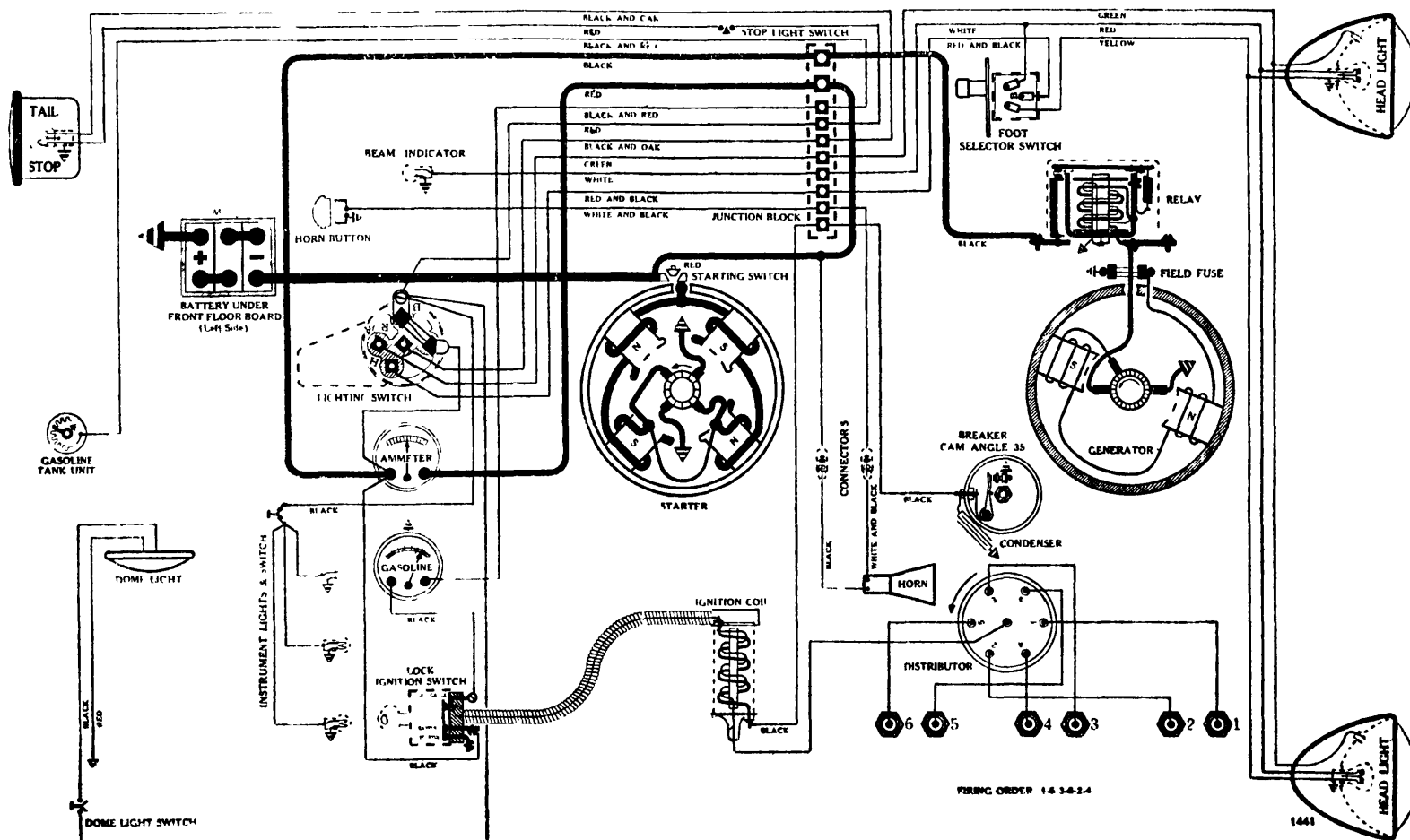
Foot Selector Switch—Douglas, No. 5398.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—63; INSTRUMENT—63; DOME—63; STOP—87; TAIL—63.

STUDEBAKER

Engin { **B r** 3-1/4
 { **Stroke** 4-3/8

Model 3-A, Dictator, 6 cyl., (1936)



BATTERY

Willard, WH-1-13, 6 volts. Positive Terminal Grounded
Starting Capacity—120 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1.
Lighting Capacity—5.1 amps. for 20 hours (102 amp. hour).
Box— Length, 9-1/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

A-L Test CU-430 Potat on, L. H., Com. End
Auto-Lite, MAX-4019

Connection to Engine—Bendix Drive, Type A-1729.
Running Free—65 amps. at 5½ volts, 5300 R.P.M.
Cranking Engine—170 amps. at 5.4 volts.
Engine Cranking Speed—144 R.P.M.
Stall Data (on Car)—480 amps. at 3.9 volts.
Lock Torque (for test bench use)—16½ pound-feet, 640 amps. at 3 volts.
Brush Spring Tension—42 to 53 oz. on each (new brushes).
Starting Switch—Auto-Lite, SW-3737-A, mounted on starter.
 Switch should not close with less than 2.3 lbs. pull applied at right angles to hole in extreme end of lever.
Armature—Auto-Lite, MAW-2091.

IGNITION

A-L Test 469 **Notation, L. H., Top View**
Auto-Lite, IGW-4001

(Full Automatic Spark Advance in conjunction with Auto-Lite VC-4001 Vacuum Control, which turns the entire Distributor) Breaker—Contact separation .020 inch.

Cam Angles—Points closed 35 degrees; open 25 degrees (by actual tests).

Cam Angles—Points closed 40 degrees; open 20 degrees (official A-L data).

Contact Spring Tension—16 to 20 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when "Ign" mark on vibration dampener (found approximately 9/64 inches ahead of "U.D.C 16" mark) registers with pointer on the timing gear cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type 8); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance Unit (Auto-Lite VC-4001; Auto-Lite specification No. 90)—3 degrees (Dist. advance). Starts with vacuum of 3 inches mercury. Requires vacuum of 6 inches for full travel.

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
800	400	Start
1200	600	2
1600	800	4
2000	1000	6
2400	1200	8
2800 (Max.)	1400	10

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4634.

Ign. Coil Only—A-L, IG-3245-S.

Ign. Switch and Cable Assembly Less Lock -A-L, CE-1242-S.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GBM-4604-A-2 (Belt Drive, Air Cooled)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	685	6.5	12	1850	7.5
4	850	6.7	16.	1900	7.8
8	1020	7.2	18	2400 (Max.)	8.

Motoring Freely—5½ to 6 amps. at 6 volts.
Max. Stall Current—24 to 26 amps. at 6 volts.
Field Test—3.8 to 4.2 amps. at 6 volts across field coils in series.
Field Fuse—5 amps. (type 1A-5).
Brush Spring Tension—36 oz. Max. on each (new brushes).
Armature—Auto-Lite, GBM-2006-B.
Third Brush Adjustment—Loosen cover band. Shift third brush by hand.
 Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4021

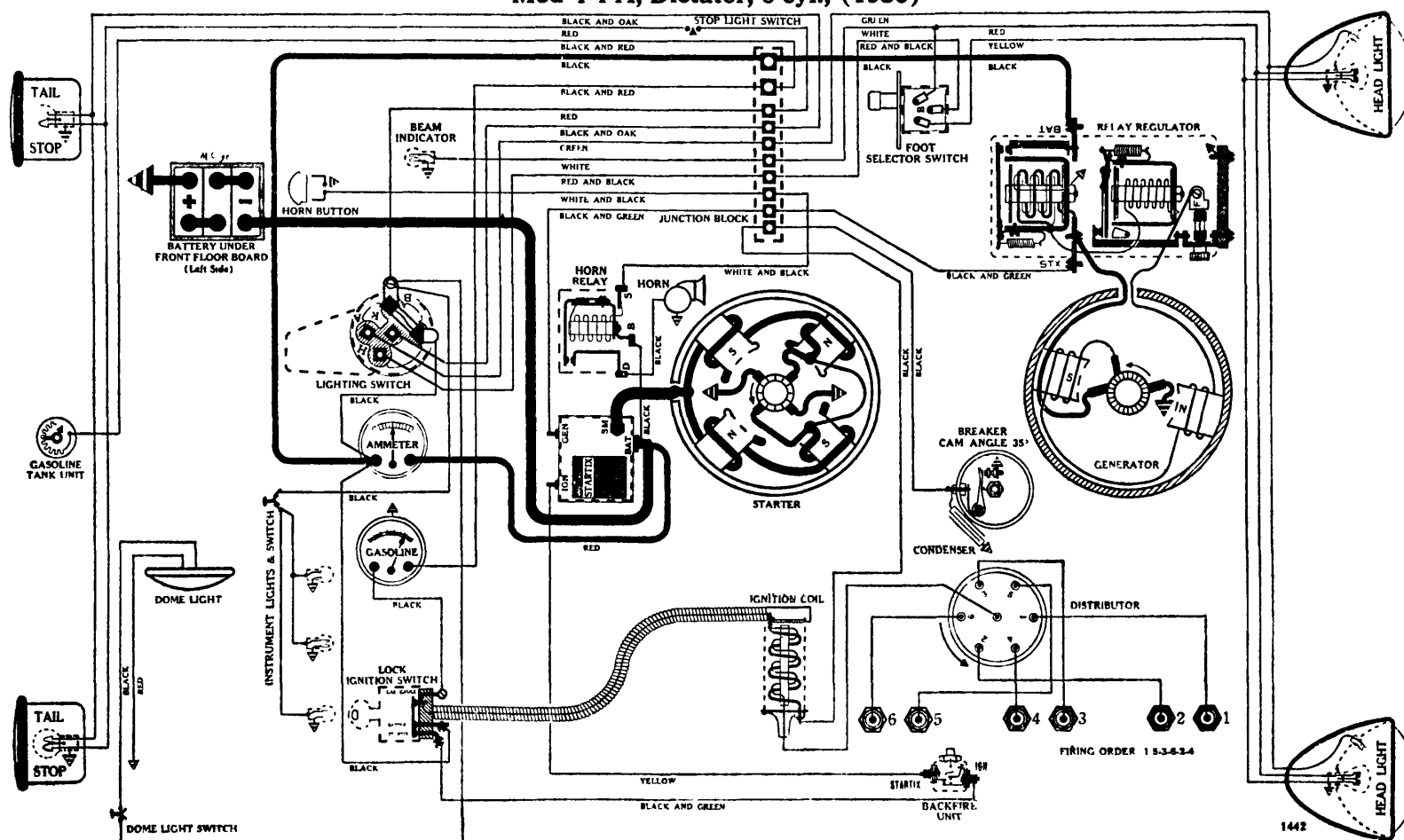
Closes— $6\frac{3}{4}$ to $7\frac{1}{2}$ volts.
Opens— $\frac{1}{2}$ to $2\frac{1}{2}$ amps. discharge.
Contact Gap—.025 to .035 inch.
Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Douglas, No. 5443.
Location—Behind instrument board.
Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back.
Foot Selector Switch—R.B.M. Mfg. Co. No. 1050-A.
Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2381
(Bar Filament); PARK—55; INSTRUMENT—51; DOME—81;
TRUNK—81; STOP AND TAIL—1158.

STUDEBAKER

Mod 14-A, Dictator, 6 cyl., (1936)

 Engin { Bor 3-1/4
 { Strok 4-3/8


BATTERY

Willard, WH-1-13, 6 volts. Positive Terminal Grounded

For Data see page 1441 (Model 3-A, 1936)

STARTER

A-L Test CU-430 Rotation, L. H., Com. End
Auto-Lite, MAX-4018

Connection to Engine—Bendix Drive, Type A-1729.

Running Free—65 amps. at 5½ volts, 5300 R.P.M.

Cranking Engine—170 amps. at 5.4 volts.

Engine Cranking Speed—144 R.P.M.

Stall Data (on Car)—480 amps. at 3.9 volts.

Lock Torque (for test bench use)—16½ pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.

Armature—Auto-Lite, MAW-2091.

IGNITION

A-L Test 469 Rotation, L. H., Top View
Auto-Lite, IGW-4001

(Full Automatic Spark Advance in conjunction with Auto-Lite VC-4001 Vacuum Control, which turns the entire Distributor).

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 35 degrees; open 25 degrees (by actual tests).

Cam Angles—Points closed 40 degrees; open 20 degrees (official A-L data).

Contact Spring Tension—16 to 20 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when "Ign" mark on vibration dampener (found approximately 9/64 inches ahead of "U.D.C. 16" mark) registers with pointer on the timing gear cover.

With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type 8); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance Unit (Auto-Lite VC-4001; Auto-Lite specification No. 90)—3 degrees (Dist. advance). Starts with vacuum of 3 inches mercury. Require vacuum of 6 inches for full travel.

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
800	400	Start
1200	600	2
1600	800	4
2000	1000	6
2400	1200	8
2800 (Max.)	1400	10

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4634.

Ign. Coil Only—A-L, IG-3245-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1242-S.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4609-A-4

(Special High Output Generator, Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.6	12	1150	7.5
2	750	6.7	16	1400	7.9
4	850	6.9	20	1700	8.2
6	875	7.	21½	2000	8.3
8	950	7.1	22	2200 (Max.)	8.4

Running Free—4¼ to 5¼ amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 5.6 volts.

Field Test—3.7 to 4.1 amps. at 6 volts across field coils in series.

Field Fuse—5 amp. (type 1A-5) in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116-B.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4302-A with TC-51 Resistance Unit

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.5 to 7.3 volts (hot or cold).

Opens—0 to 3 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

Regulator—Contact Spring Tension—10 to 12 oz.

A-L Test 119 Points Open—8.25 volts (70° F.)

Points Close—7.0 volts.

For Regulator Adjustments at other temperatures see complete data in Technical Section.

Contact Opening—.005 inch (minimum).

Core Gap—.045 inch (contacts closed).

LIGHTING

Switch—Douglas, No. 5443.

Location—Behind instrument board.

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back.

Horn Relay—Delco-Remy, 269-E.

Foot Selector Switch—R.B.M. Mfg. Co. No. 1050-A.

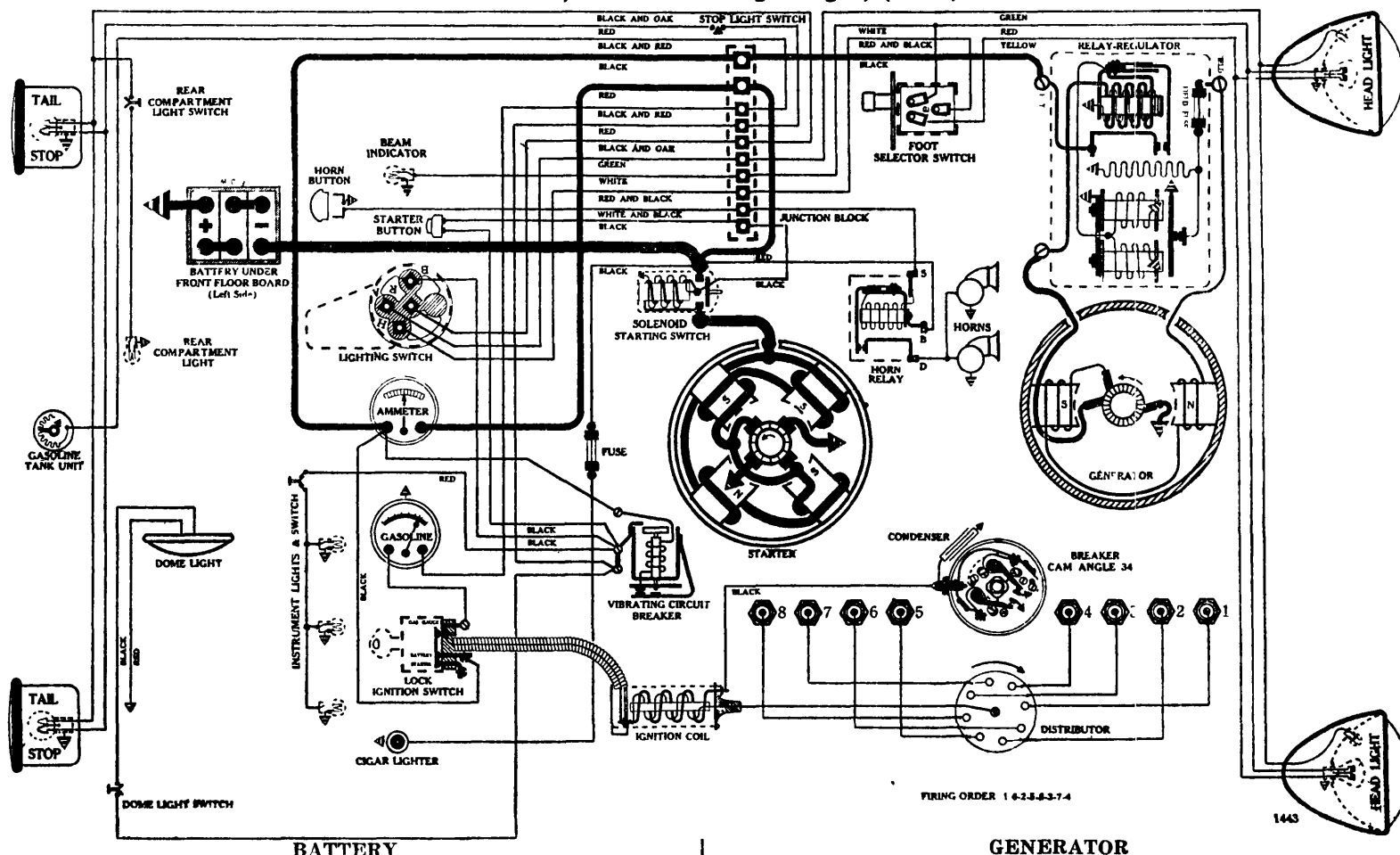
Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2331

(Bar Filament); PARK—55; INSTRUMENT—51; DOME—81;

TRUNK—81; STOP AND TAIL—1158.

STUDEBAKER

Model 2-C, President Straight Eight, (1936)

 Engin { Bor 3-1/16
 Strok 4-1/4


Willard, WH-1-13, 6 volts. Positive Terminal Grounded
 For Data see page 1441 (Model 3-A, 1936).

STARTER

D-R Test 407 Rotation, L. H., Com. End Group 48
 Delco-Remy, 737-J

Connection to Engine—Bendix Drive, Type A-1729
 Running Free—65 amps. at 5 volts, 6000 R.P.M.
 Cranking Engine—120 amps. at 5.2 volts.
 Engine Cranking Speed—120 R.P.M.
 Stall Data (on Car)—400 amps. at 3.6 volts.
 Lock Torque (for test bench use)—15 pound-feet, 570 amps. at 3.1 volts.
 Brush Spring Tension—32 to 36 oz. on each (new brushes).
 Solenoid Starting Switch—Delco-Remy, 1528.
 Armature—Delco-Remy, 1863128.

IGNITION

D-R Test 955 Rotation, R. H., Top View Group 62
 Delco-Remy, 662-M

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-J Vacuum Control, which turns the entire Distributor).
 Breakers—Contact separation .020 inch on each.
 Cam Angles—Points closed 34 degrees; open 56 degrees (each breaker separately)
 Primary circuit closed 34 degrees, open 11 degrees (with both breakers operating)
 Contact Spring Tension—17 to 21 oz. on each.
 Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.
 Timing—With No. 1 piston on compression stroke, bring flywheel mark "U.D.C. 1-8" directly under pointer on the right side of flywheel housing. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.
 Spark Plugs—18-MM (Champion type 8); Gap .025 inch.
 Firing Order—1-6-2-5-8-3-7-4.
 Vacuum Advance Unit (Delco-Remy, 680-J; test No. 668)—3 degrees (Dist. advance). Starts with vacuum of 3 inches mercury. Requires vacuum of 6 inches for full travel.
 Automatic Advance—14½ degrees (Distributor).

Eng R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
330	165	Start
1000	500	3
1900	950	7
2800	1400	11
3600 (Max.)	1800	14½

 Ignition Coil—Delco-Remy, 537-B.
 Ignition Switch and Cable—Delco-Remy, 430-R.

GENERATOR

D-R Test 1254 Rotation, L. H., Com. End Group 24
 Delco-Remy, 936-X (Belt Drive, Air Cooled)
 Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.5	12	1300	7.6
4	860	6.8	16	1630	7.9
8	1040	7.2	22	2800 (Max.)	8.5

Motoring Freely—3½ to 4 amps. at 6 volts.
 Max. Stall Current—23 to 26 amps. at 6 volts.
 Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.
 Field Fuse—6 amp. (type 3A-6) in regulator unit.
 Brush Spring Tension—Main brushes 22 to 26 oz. Third, 16 to 20 oz. (new brushes).
 Armature—Delco-Remy, 1856072.
 Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAY-REGULATOR

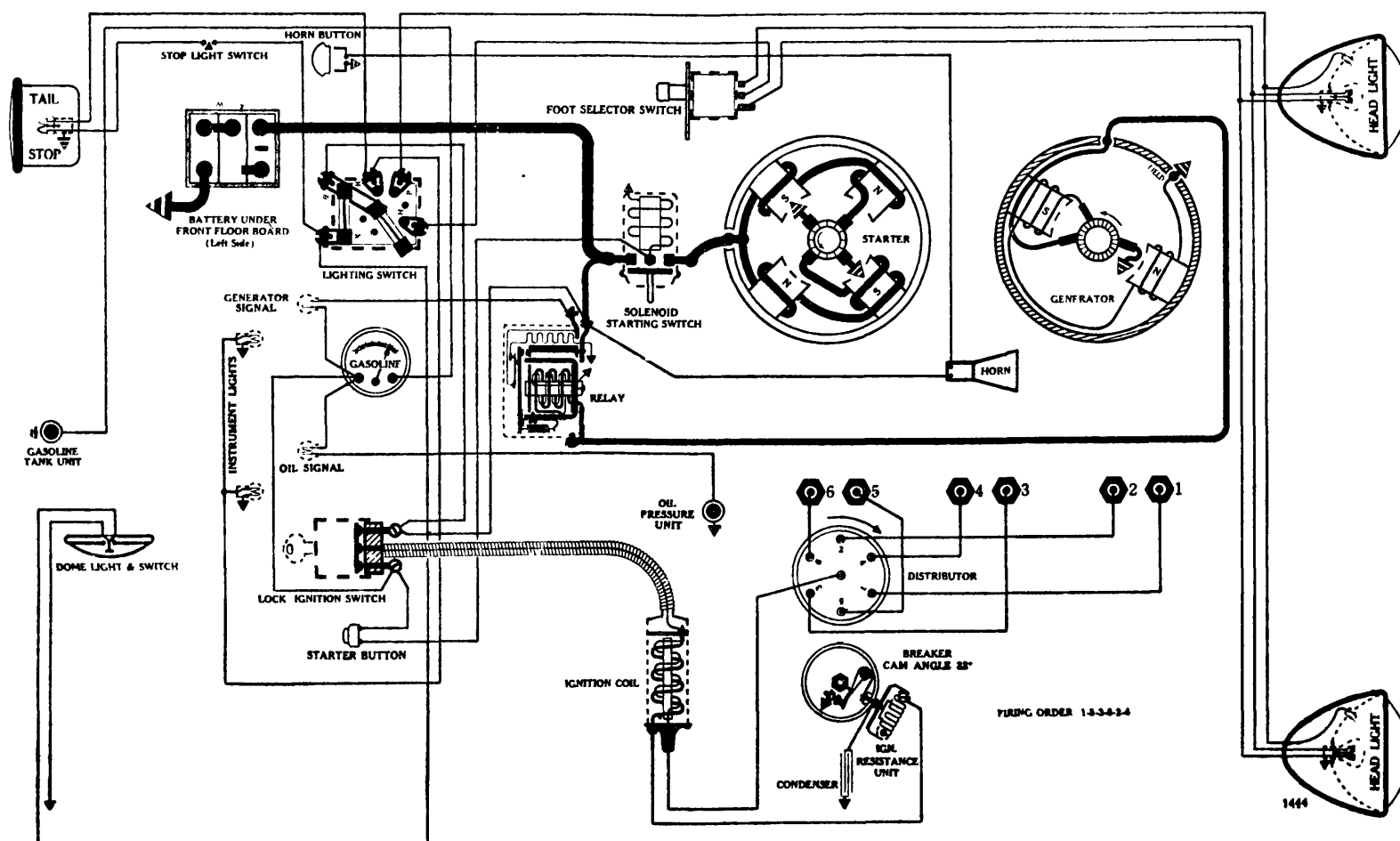
D-R Test 1242 Delco-Remy, 5546
 A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator
 Cut-Out Relay—Closes—6.4 to 6.8 volts.
 Opens—.0 to 3 amps. discharge at 6.3 volts.
 Contact Gap—.015 to .025 inch.
 Core Gap—.012 to .017 inch, contacts closed.
 Regulator—Contact Spring Tension—.7 to .9 oz. (measured at contacts).
 Air Gap—.028 to .040 inch (armature pressed down against lower stop).
 Contact Opening—.008 to .013 inch (armature pressed down against lower stop).
 Armature Travel—.028 to .040 inch (armature released).
 Points Open—8.35 to 8.65 volts (70° F.)
 Points Close—7.3 to 7.7 volts (70° F.).

LIGHTING

Switch—Douglas, No. 5442.
 Location—Behind instrument board.
 Vibrating Circuit Breaker—Delco-Remy, 410-R. Starts 25 to 30 amps. Operates 10 to 15 amps.
 Horn Relay—Delco-Remy, 269-E.
 Foot Selector Switch—R.B.M. Mfg. Co. No. 1050-A.
 Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2331 (Bar Filament); PARK—55; INSTRUMENT—51; DOME—81; TRUNK—81; STOP AND TAIL—1158.

TERRAPLANE

Mod 1 61, D Lux , 6 cyl., (1936)

 Engine { Bore 3
 Strok 5


BATTERY

National, ST3-17X, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.2.

Lighting Capacity—4.9 amps. for 20 hours (98 amp. hour).

Box—Length, 10-9/16; width, 7 1/4; height, 7-15/16 inches.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End

Auto-Lite, MAB-4075

Connection to Engine—Bendix Drive, Type A-1673.

Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.

Cranking Engine—120 amps. at 5.55 volts.

Engine Cranking Speed—144 R.P.M.

Stall Data (on Car)—440 amps. at 4.3 volts.

Lock Torque (for test bench use)—15 1/2 pound-feet, 582 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (new brushes).

Sol noid Starting Switch—Auto-Lite, SS-4001.

Push Button Starting Control Switch—Soreng-Manegold, A-5550-A.

Armature—Auto-Lite, MAB-2113.

IGNITION

A-L Test 447 Rotation, R. H., Top View

Auto-Lite, IGB-4301-B

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 32 degrees; open 28 degrees (by actual tests).

Cam Angles—Points closed 40 degrees; open 20 degrees (official A-L data).

Contact Spring Tension—16 to 20 oz.

Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "U D.C. 16" registers with pointer cast in flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14 MM (Champion type J-8-A, used with standard compression engines. Champion type H-10 used with engines having compression ratio of 7 to 1). Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—14 degrees (Distributor).

(IMPORTANT NOTE: Official Auto-Lite advance characteristics for this distributor have been changed since 1935. The following is the latest information available, and check with distributors tested).

Eng. R.P.M.

Dist. R.P.M.

Degrees Advance (Dist.)

600	300	Start
800 (Intermediate)	400	3
1656	828	7
2300	1150	10
3160 (Max.)	1580	14

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4633.

Ign. Coil Only—A-L, IG-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-2233-BS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4702 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. NOTE: The field terminal is purposely grounded by a cup where stud comes thru field frame.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	725	6.5	12	1875	7.5
4	950	6.8	16	1780	7.8
8	1180	7.	18	2200 (Max.)	8.

Motoring Freely—4 1/2 to 5 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 6 volts.

Field Test—3.7 to 4.1 amps. at 6 volts across field coils in series.

Brush Spring Tension—22 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2077.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CBA-4003 (Mounted on Dash)

Closes—6 1/4 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Soreng-Manegold, No. 5770-A.

Location—Behind instrument board.

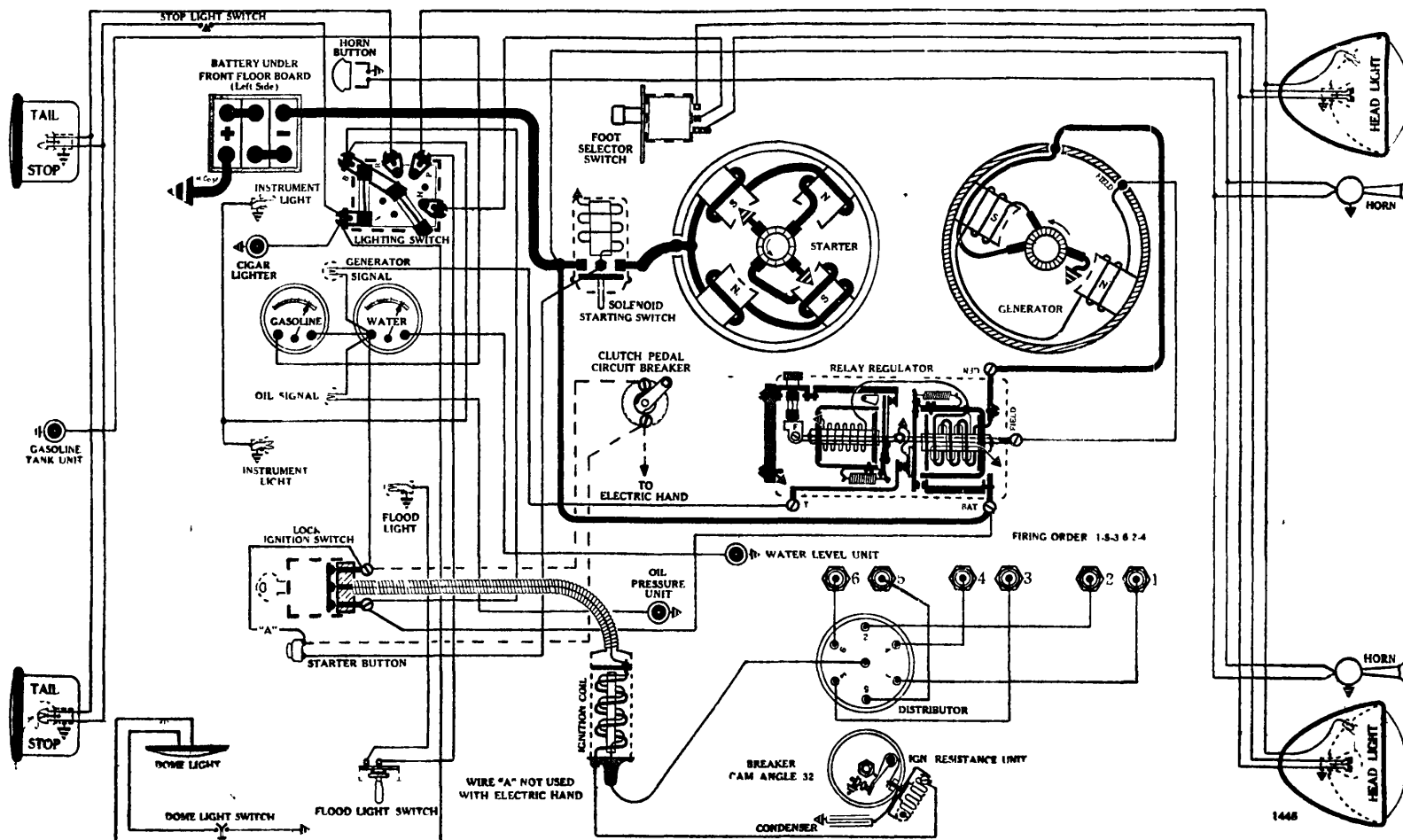
Fuses—Two 20 amp. fuses (type 3A-20) mounted on lighting switch.

Foot Selector Switch—Douglas, No. 5331.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2331 (Bar Filament); PARK—55; INSTRUMENT—55; FLOOD—63; SIGNALS—51; DOME—87; STOP AND TAIL—1158.

TERRAPLANE

Mod 162, Custom, 6 cyl., (1936)

 Engine { Bore 3
 { Stroke 5


BATTERY

National, ST3-17X, 6 volts. Positive Terminal Grounded
 Starting Capacity—120 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—3.2.
 Lighting Capacity—4.9 amps. for 20 hours (98 amp. hour).
 Box—Length, 10-9/16; width, 7 1/4, height, 7-15/16 inches.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End
 Auto-Lite, MAB-4075
 For Data see Page 1444 (Model 61, 1936).

IGNITION

A-L Test 447 Rotation, R. H., Top View
 Auto-Lite, IGB-4301-B
 (Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.
 Cam Angles—Points closed 32 degrees; open 28 degrees (by actual tests).
 Cam Angles—Points closed 40 degrees; open 20 degrees (official A-L data).
 Contact Spring Tension—16 to 20 oz.
 Timing—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "U D C 16" registers with pointer cast in flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.
 Spark Plugs—14 MM (Champion type J 8 A, used with standard compression engines. Champion type H-10 used with engines having compression ratio of 7 to 1); Gap .025 inch.
 Firing Order—1-5-3-6-2-4.
 Automatic Advance—14 degrees (Distributor).
 (IMPORTANT NOTE Official Auto Lite advance characteristics for this distributor have been changed since 1935. The following is the latest information available, and check with distributors tested).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600	300	Start
800 (Intermediate)	400	3
1656	828	7
2300	1150	10
3160 (Max.)	1580	14

 Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4633.
 Ign. Coil Only—A-L, IG-3224-S.
 Ign. Switch and Cable Assembly Less Lock—A-L, CE-2283-BS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAR-4701-6 (Belt Drive, Air Cooled)

Performance Data—Gen. cold. Field lead grounded to generator.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.6	12	1150	7.5
2	750	6.7	16	1400	7.9
4	850	6.9	20	1700	8.2
6	875	7.	21 1/2	2000	8.3
8	950	7.1	22	2200 (Max.)	8.4

Running Free—5 to 5 1/2 amps. at 6 volts.
 Max. Stall Current—32 amps. at 4 1/2 volts.
 Field Test—3.5 to 3.8 amps. at 6 volts across field coils in series.
 Field Fuse—5 amps. (type 1A-5), in regulator unit.
 Brush Spring Tension—22 oz. Max. on each (new brushes).
 Armature—Auto-Lite, GAR-2077.
 Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4304-A with TC-51 Resistance Unit

A combination of Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay—Closes—6.5 to 7.3 volts (hot or cold).

Opens—0 to 3 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

Regulator—Contact Spring Tension—10 to 12 oz.

A-L Test 114 Points Open—8.0 volts (70° F.).

Points Close—6.7 volts.

For Regulator Adjustment at other temperatures see complete data in Technical Section

Contact Opening—.005 inch (minimum).

Core Gap—.045 inch (contacts closed).

LIGHTING

Switch—Soreng-Manegold, No. 5770-A.

Location—Behind instrument board.

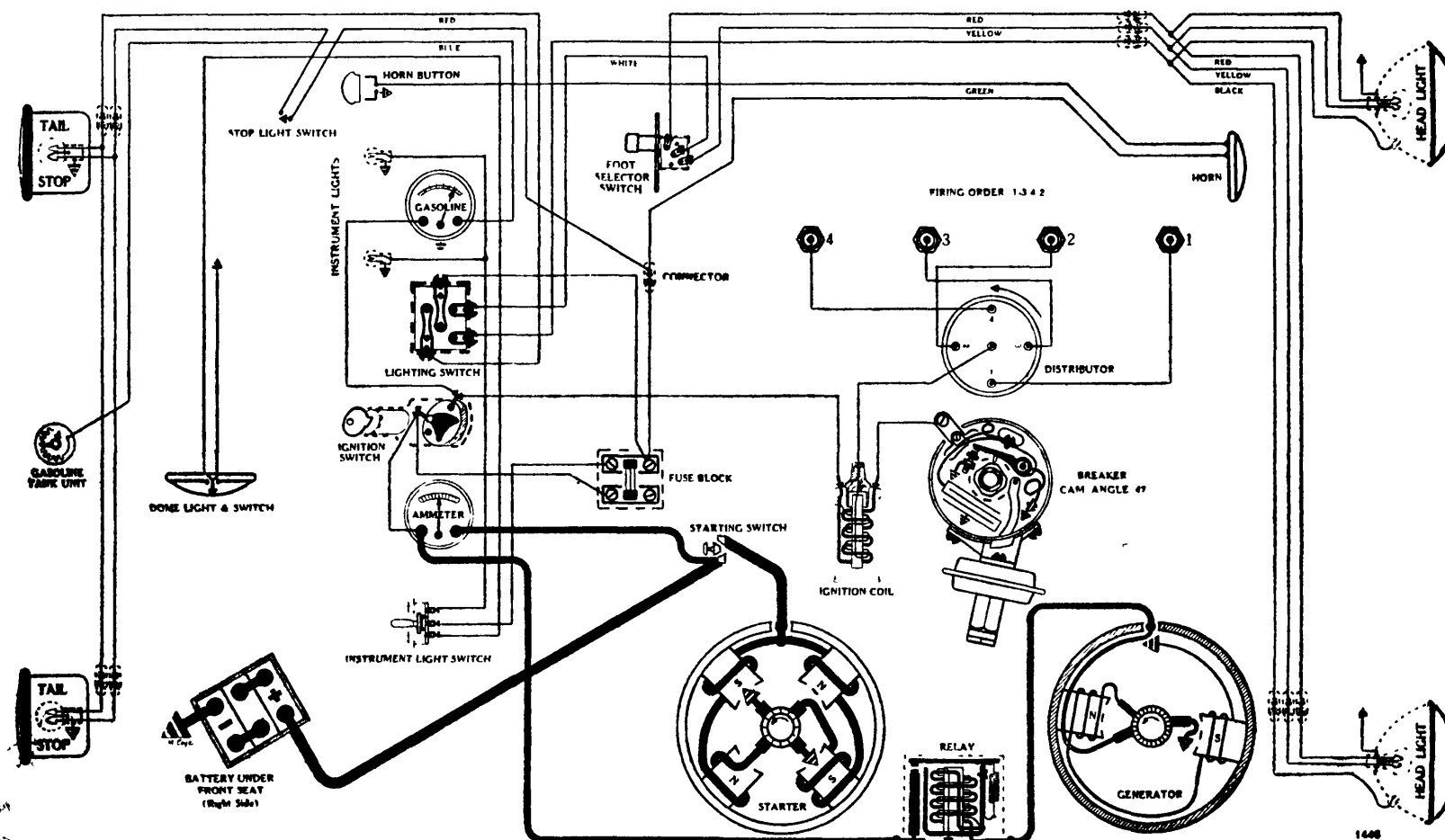
Fuses—Two 20 amp. fuses (type 3A-20) mounted on lighting switch.

Foot Selector Switch—Douglas, No. 5331.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2331 (Bar Filament); PARK—55; INSTRUMENT—55; FLOOD—63; SIGNALS—51; DOME—87; STOP AND TAIL—1158.

WILLYS

Model 77, 4 cyl., (1936)

 Engin { Bor 3-1/8
 Strok 4-3/8
**BATTERY**

U.S.L., A-13A, 6 volts. Negative Terminal Grounded

Starting Capacity—96 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—1.9.

Lighting Capacity—3.9 amps. for 20 hours (78 amp. hour).

Box—Length, 9; width, 7; height, 8 3/4 inches.

STARTER

A-L Test CU-162 Rotation, L. H., Com. End

Auto-Lite, MZ-4033

Connection to Engine—Bendix Drive, Type RC10HD.

Running Free—47 amps. at 5 1/2 volts, 4902 R.P.M.

Cranking Engine—96 amps. at 5.1 volts.

Engine Cranking Speed—120 R.P.M.

Stall Data (on Car)—300 amps. at 2.9 volts.

Lock Torque (for test bench use)—10 pound-feet, 470 amps. at 3 1/2 volts.

Brush Spring Tension—44 to 56 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-4001.

Armature—Auto-Lite, MZ-2089.

IGNITION

A-L Test 466 Rotation, L. H., Top View

Auto-Lite, IGS-4007

(Full Automatic Spark Advance in conjunction with Auto-Lite IGT-1028-AS Vacuum Advance Unit, which controls position of Breaker Plate)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 47 degrees; open 43 degrees (official A-L data and by actual tests).

Contact Spring Tension—16 to 20 oz.

Timing—Loosen screw holding flywheel inspection hole cover, located in left top side of flywheel housing, and swing cover to one side. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "IGN" is directly under pointed end of inspection plate screw. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type C-7); Gap .027 inch.

Firing Order—1-3-4-2.

Vacuum Advance Unit (Auto-Lite IGT-1028-AS; test No. 467)—10 degrees (Dist. advance). Starts with vacuum of from 2.5 to 4.5 inches mercury. Requires vacuum of 15 inches for full travel.

Automatic Advance—14 degrees (Distributor).

Eng. R.P.M.

Dist. R.P.M.

Degrees Advance (Dist.)

500	250	Start
600	300	2
700 (Intermediate)	350	4
1240	620	6
1780	890	8
2590	1295	11
3400 (Max.)	1700	14

Ignition Coil—Auto-Lite, IG-4090.

Lock Ignition Switch—Mitchell Specialty, Type 17.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAM-4504 (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts	Amps.	R.P.M.	Volts
0	700	6.4	10	1100	7.2
2	785	6.6	12	1320	7.4
6	960	6.9	16	2400 (Max.)	8.

Motoring Freely—4 1/2 to 5 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4.2 amps. at 6 volts across field coils in series.

Brush Spring Tension—22 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAM-2055.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4008 (Mounted on Sub Frame)

Closes—6 3/4 to 7 1/2 volts.

Opens—1/2 to 2 1/2 amps. discharge.

Contact Gap—.025 to .035 inch.

Core Gap—.010 to .030 inch, contacts closed.

LIGHTING

Switch—Culver-Stearns.

Location—Lower edge of instrument board, above steering post.

Fuses—Single 20 amp. fuse (type 3A-20) in fuse block on dash board, under cowl (driver's side).

Foot Selector Switch—Soreng-Manegold, No. A2100-A.

Lamps—Refer to "Lamp Data" in Technical Section. HEAD—1110; PARK—63; INSTRUMENT—63; DOME—63; STOP AND TAIL—1158.

LAMP DATA

REVISED TO JUNE 1, 1937

Code numbers, technical specifications and data verified by The Nela Park Engineering Department
of the General Electric Company, Nela Park, Cleveland, Ohio.

CONVENTIONAL MAZDA LAMP

No.	USED FOR	VOLTS	C.P.	BASE	AMPS.	STYLE	B or C
35	General Electric Photometric Battery Tester	2.40	1.0†	Miniature Screw	0.80	G-5	B
50	Head Light Indicators (Cadillac and LaSalle 1934)	6-8	1	Miniature Screw	0.20	G-3½	B
51	Indicators, Instrument	6-8	1	Miniature Bayonet	0.20	G-3½	B
55	Indicator, Inst., Aux. Head	6-8	1.5†	Bayonet	0.40	G-4½	C
61	Rear & Inst. (2 in series)	3-4	2†	S.C.	0.84	G-6	B
62	Rear & Inst. (2 in series)	3-4	2†	D.C.	0.84	G-6	B
63	Rear, Inst., Marker, Parking	6-8	3	S.C.	0.54	G-6	C
64	Rear, Inst., Marker, Parking	6-8	3	D.C.	0.54	G-6	C
67	Rear, Inst., Marker, Parking	12-16	3	S.C.	0.30	G-6	C
68	Rear, Inst., Marker, Parking	12-16	3	D.C.	0.30	G-6	C
81	Dome, Panel, Instrument	6-8	6	S.C.	0.89	G-6	C
82	Dome, Panel, Instrument	6-8	6	D.C.	0.89	G-6	C
87	Stop, Backing, Dome	6-8	15	S.C.	1.76	S-8	C
88	Stop, Backing, Dome	6-8	15	D.C.	1.76	S-8	C
89	Dome, Panel, Sign, Marker	12-16	6	S.C.	0.53	G-6	C
90	Dome, Panel, Sign, Marker	12-16	6	D.C.	0.53	G-6	C
1000	Head (2 filaments) depressible beam	6-8	32}	D.C.	3.82}	RP-11	C
			32}		3.82}		
1104	Head (Prefocused, Clear, "V" type Filament)	See next page.		Left H.L. Packard Super 8 and 12 cyl., 1937 only.			
1110	Head (2 filaments) depressible beam	6-8	21}	D.C.	2.49}	RP-11	C
			21}		2.49}		
1114	Head (2 filaments) depressible beam	6-8	21}	D.C.	2.62}	RP-11	C
	<i>Read foot-note before installing.</i>		21}		2.62}		
1116	Head (2 filaments) depressible beam	6-8	32}	D.C.	3.82}	RP-11	C
			21}		2.52}		
1118	Head (2 filaments) depressible beam	6-8	32}	D.C.	4.00}	RP-11	C
	<i>Read foot-note before installing.</i>		21}		2.62}		
1129	Head, Spot, Stop, Driving Lamps	6-8	21	S.C.	2.42	S-8	C
1130	Head, Spot, Stop, Driving Lamps	6-8	21	D.C.	2.42	S-8	C
1133	Head, Spot, Stop, Driving Lamps	6-8	32	S.C.	3.72	RP-11	C
1134	Head, Spot, Stop, Driving Lamps	6-8	32	D.C.	3.72	RP-11	C
1141	Head, Spot, Driving Lamps	12-16	21	S.C.	1.23	S-8	C
1142	Motor Coach, Headlamps, Interior	12-16	21	D.C.	1.27	S-8	C
1143	Head, Spot, Driving Lamps	12-16	32	S.C.	1.76	RP-11	C
1144	Head, Spot, Interior	12-16	32	D.C.	1.86	RP-11	C
1154	Tail & Stop	6-8	21}	D.C. Index	2.82}	S-8	C
	Oldsmobile, Buick, Cadillac & LaSalle (1937)		3}		0.62}		
1158	Head for Fords (1921 to 1928)	6-8	21}	D.C.	2.49}	S-8	C
	Also Stop and Tail from 1929 on		3}		0.55}		
1170	Head for Fords (1921 to 1928)	6-8	21}	D.C.	2.62}	S-8	C
			6}		0.95}		
1172	Head for Fords (1921 to 1928)	6-8	32}	D.C.	4.00}	RP-11	C
			6}		0.95}		
1323	(Prefocused, Clear, "V" type Filament)	See next page.					
2320	(Prefocused, Clear, "V" type Filament)	See next page.					
2320-S	(Prefocused, Shielded, "V" type Filament)	See next page.					
2330	(Prefocused, Clear, "V" type Filament)	See next page.					
2330-S	(Prefocused, Shielded, "V" type Filament)	See next page.					
2331	(Prefocused, Clear, "Bar" type Filament)	See next page.					
2331-S	(Prefocused, Shielded, "Bar" type Filament)	See next page.					
2530	(Prefocused, Clear, "V" type Filament)	See next page.					
3001	Head for Cadillacs (1932-33 only)	6-8	21}	T.C.*	2.92}	S-12	C
			21}		2.92}		
			32}		4.09}		
3003	Head for Packards (1933-34 only)	6-8	32}	T.C.*	4.15}	S-12	C
			32}		4.15}		
			32}		4.15}		

†Approximate.

*Triple Contact.

IMPORTANT: Mazda lamps Nos. 1000, 1110, and 1116 are interchangeable. Automobiles equipped with depressible beam headlights (sometimes called "Tilt-Ray" or "Bifocal" headlights) were formerly delivered with the 21-21 C.P., No. 1110 lamps as original equipment. If higher C. P. lamps are desired, substitute the 32-32 C.P., No. 1000 lamps, or the No. 1116 lamps. *Under no circumstances use lamps Nos. 1114 or 1118 in these cars.*

The difference between Mazda lamps Nos. 1000, 1110, and 1116, and Mazda lamps Nos. 1114 and 1118 is in the plane of the base pins.

(OVER)

LAMP DATA

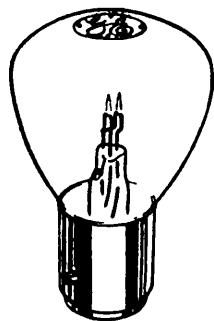
(continued)

REVISED TO JUNE 1, 1937

The prefocused lamp developed for modern headlights.
(Prefocused lamps will not fit conventional sockets.)

PREFOCUSED MAZDA LAMP No.	BULB	FILAMENT FORM	USED FOR	VOLTS	C.P.	BASE	AMPS	STYLE	B or C
1104	Clear	"V" type	Left Head Light, Packard 1937	6-8	32	D.C. Pre-	6.70	RP-11	C
			(2 filaments) depressible beam		21	focused	4.13		
1323	Clear	"V" type	Spot, Driving, and Fog Lights ...	6-8	32	S.C. Pre-	4.37	RP-11	C
						focused			
2320	Clear	"V" type	Head (2 filaments) depressible beam	6-8	32	Pre-	4.23	RP-11	C
					21	focused	2.75		
2320-S	Shielded	"V" type	Head (2 filaments) depressible beam	6-8	32	Pre-	4.23	RP-11	C
					21	focused	2.75		
2330	Clear	"V" type	Head (2 filaments) depressible beam	6-8	32	Pre-	4.23	RP-11	C
					32	focused	4.23		
2330-S	Shielded	"V" type	Head (2 filaments) depressible beam	6-8	32	Pre-	4.23	RP-11	C
					32	focused	4.23		
2331	Clear	"Bar" type	Head (2 filaments) depressible beam	6-8	32	Pre-	4.70	RP-11	C
					32	focused	4.50		
2331-S	Shielded	"Bar" type	Head (2 filaments) depressible beam ..	6-8	32	Pre-	4.70	RP-11	C
					32	focused	4.50		
2530	Clear	"V" type	Head (2 filaments) depressible beam	6-8	50	Pre-	6.53	RP-11	C
					32	focused	4.23		

A MAJOR ADVANCE IN HEADLIGHTING PRACTICE

CONVENTIONAL
LAMP

The prefocused lamp introduced in 1934 is standard equipment on almost all 1935, 1936 and 1937 cars.

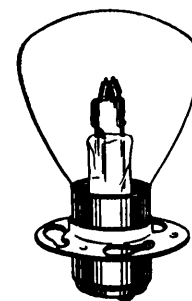
It insures a more uniform performance of headlamps throughout the life of the car.

It made possible the new design in headlight equipment whereby headlights were made smaller—to become part of the car's "stream-lines."

It makes for greater beam accuracy.

The lamp itself is made with extreme precision.

The maximum tolerance in the location of the filament is .010 of an inch. The reflector-socket assembly is also made with greater accuracy.

PREFOCUSED
LAMP

EASY TO INSTALL

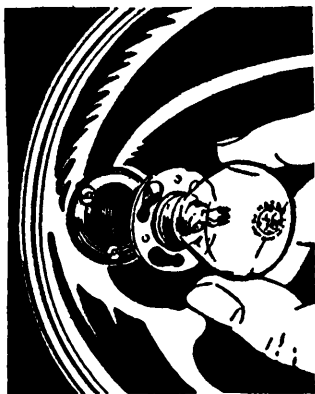
Insertion of the lamp is easier than under the old method. The flanged collar has three "buttonholes" unequally spaced, which engage three pins in the socket. The base is marked "TOP."

Hold lamp in position marked "TOP."

Make certain that the pin heads of socket engage wide ends of buttonholes.

Press firmly into the seat at the rear of reflector.

Rotate clockwise until lamp clicks into its seat. To remove lamp reverse the operation.



SHIELDED BULBS MASK DIRECT FILAMENT RAYS

Shielded bulbs differ from conventional types in that there is an opaque coating on the end of the bulb that masks most of the direct rays which normally do not strike the reflector.

By shielding most of the direct rays, spilled or scattered light is reduced, thereby improving visibility when driving through a hazy or foggy atmosphere.

While the shielded bulb does not reduce glare* from the main driving beam, it minimizes annoyance from scattered light, thereby making headlights more comfortable to the eye when viewed at close range by approaching motorists.

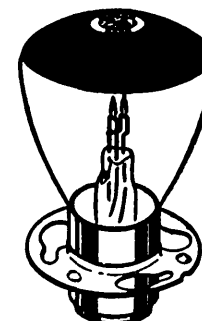
MAZDA shielded bulbs are coated with a black glass enamel which is fused to the bulb. The coating is permanent. It will neither crack nor peel in service.

All popular types of MAZDA headlight lamps may be obtained with shielded bulbs.

*Serious glare is produced by improperly adjusted headlight beams. The shielded bulb neither eliminates the necessity for proper headlight adjustment nor the need for depressing beams when meeting other cars.

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Following tests revised to conform with official Auto-Lite Specifications dated Feb. 6, 1936

TC-4100 series charge regulators and TC-4200 series combination circuit breaker and charge regulators should be adjusted to perform in accordance with the following table:

ROOM TEMPERATURE DEGREES F.	TEST No. 91	POINTS TO OPEN VOLTS	ROOM TEMPERATURE DEGREES F.	TEST No. 91	POINTS TO OPEN VOLTS
50		8.38 to 8.82	90		8.13 to 8.54
60		8.32 to 8.75	100		8.07 to 8.50
70		8.26 to 8.67	110		8.02 to 8.44
80		8.20 to 8.60			

Closing voltage should be below opening voltage by 1.6 to 1.8 volts for any given temperature.

TC-4304 and TC-4304-A only (Hudson and Terraplane 1935) combination circuit breaker and charge regulators should be adjusted to the following specifications and perform in accordance with the table below:—

NICKEL-IRON COMPENSATED.

Core Gap—.020 inch (contacts closed).		Contact Separation—.005 inch (minimum).		Contact Spring Tension—10 to 12 oz.	
ROOM TEMPERATURE DEGREES F.	TEST No. 114	POINTS TO OPEN VOLTS	ROOM TEMPERATURE DEGREES F.	TEST No. 114	POINTS TO OPEN VOLTS
50		8.14 to 8.64	90		7.86 to 8.36
60		8.07 to 8.57	100		7.79 to 8.29
70		8.00 to 8.50	110		7.72 to 8.22
80		7.93 to 8.43			

Closing voltage should be below opening voltage by 1.2 to 1.4 volts for any given temperature.

TC-4300 series (all others) combination circuit breaker and charge regulators should be adjusted to the following specifications and perform in accordance with table below.

NICKEL-IRON COMPENSATED.

Core Gap—.020 inch (contacts closed).		Contact Separation—.005 inch (minimum).		Contact Spring Tension—10 to 12 oz.	
ROOM TEMPERATURE DEGREES F.	TEST No. 119	POINTS TO OPEN VOLTS	ROOM TEMPERATURE DEGREES F.	TEST No. 119	POINTS TO OPEN VOLTS
50		8.4 to 8.9	90		8.10 to 8.60
60		8.32 to 8.82	100		8.03 to 8.53
70		8.25 to 8.75	110		7.96 to 8.46
80		8.18 to 8.68			

Closing voltage should be below opening voltage by 1.2 to 1.4 volts for any given temperature.

TC-RESISTANCE UNITS

Unit	Volts	Resistance Part No.	Resistance in Ohms	Identification Mark	Spec.	Notes
TC-4101A	6	TC-51	1.85 to 2.10	1.85	91	
TC-4102A	6	TC-51	1.85 to 2.10	1.85	111	25 Amp. C.B.
TC-4103A	6	TC-51	1.85 to 2.10	1.85	91	
TC-4201A	6	TC-51	1.85 to 2.10	1.85	91	
TC-4202A	6	TC-51	1.85 to 2.10	1.85	91	
TC-4301A	6	TC-51G*	1.3 to 1.5	1.4	119	*Was TC-51E
TC-4302A	6	TC-51	1.85 to 2.10	1.85	119	
TC-4302B	6	TC-51E	1.0 to 1.2	1.1	119	
TC-4303A	12	TC-51B	2.75 to 2.95	2.85	120	
TC-4303B	12	TC-51B	2.75 to 2.95	2.85	120	
TC-4303C	12	TC-51	1.85 to 2.10	1.85	120	
TC-4304A	6	TC-51	1.85 to 2.10	1.85	114	
TC-4305A	6	TC-51	1.85 to 2.10	1.85	119	
TC-4306A	6	TC-51	1.85 to 2.10	1.85	119	25 Amp. C.B.
TC-4307A	6	TC-51	1.85 to 2.10	1.85	114	
TC-4307B	6	TC-51	1.85 to 2.10	1.85	157	
TC-4308A	6	TC-51	1.85 to 2.10	1.85	119	
TC-4309A	6	TC-51	1.85 to 2.10	1.85	119	
TC-4310A	12	TC-51B	2.75 to 2.95	2.85	120	
TC-4311A	6	TC-51	1.85 to 2.10	1.85	119	
TC-4312A	6	TC-51	1.85 to 2.10	1.85	119	25 Amp. C.B.
TC-4313A	6	TC-51	1.85 to 2.10	1.85	119	25 Amp. C.B.
TC-4314A	6	TC-51	1.85 to 2.10	1.85	119	
TC-4315A	12	TC-51B	2.75 to 2.95	2.85	120	
TC-4316A	6	TC-51	1.85 to 2.10	1.85	119	
TC-4317A	6	TC-51	1.85 to 2.10	1.85	119	
TC-4318A	12	TC-51	1.85 to 2.10	1.85	120	
TC-4319A	6	TC-51	1.85 to 2.10	1.85	119	
TC-4320A	6	TC-51E	1.0 to 1.2	1.1	119	

(Issued 6-4-37)

Auto-Lite Vibrating-Point Voltage Regulators and Combination Vibrating-Point Current and Voltage Regulators

STANDARD EQUIPMENT ON 1937 CHRYSLER, DE SOTO, DODGE, HUDSON, NASH-LAFAYETTE, NASH, PACKARD, PLYMOUTH, AND TERRAPLANE AUTOMOBILES.

The new VRB Auto-Lite regulators are made up of three units, consisting of a vibrating-point voltage regulator, a vibrating-point current regulator, and a circuit breaker (cut-out relay). This series of regulators is designed for use with the new two brush Auto-Lite shunt generators. The VRD regulators are two unit combinations, consisting of a vibrating-point voltage regulator in conjunction with a circuit breaker (cut-out relay). These regulators were built for use with especially designed third brush generators which employ a field winding of higher resistance than is used in conventional third brush generators.

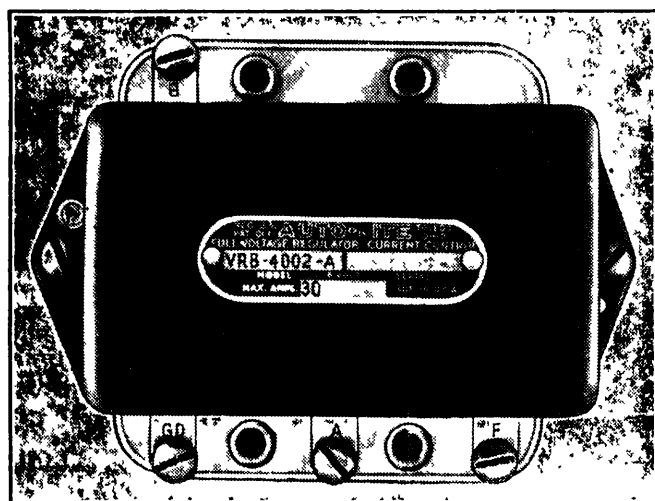


Fig. 1

Top View of a typical Auto-Lite Three Unit Regulator, of the "VRB" Series showing the Name Plate with Model and Serial Numbers, as well as the Ampere Capacity.

Up to the present time (June 1937) Auto-Lite has placed some eleven different regulators of the VRB and VRD series on the market. Of these eleven, four are the two unit VRD type regulators, and seven are the three unit VRB type regulators. It is very essential that the correct regulator be used with the generator for which it was designed. It is advisable to check all regulators brought in for repairs to make certain that it is the correct regulator for the car on which it is being used. This information can readily be verified by referring to the car wiring diagrams and data found in the Standard Auto-Electrician's Manual. Each regulator has a name plate riveted to the cover which carries the model and serial number of the unit, as well as the maximum amperage for which the unit is designed.

Figure 1 shows the top view of a three unit Auto-Lite regulator, and the location of the name plate. Before going into the details of the regulator operation it might be well to call the reader's attention to the fact that the practice of "jumping out" Auto-Lite regulators and operating the generator with no external regulation cannot be followed with the 1937 series of units. Previously this practice was quite frequently indulged in when cars were equipped with the so-called "two-stage" type of regulators.

OPERATION OF THE "VRB" REGULATORS.

The VRB regulators, used with straight shunt generators (generators without a third brush), are made up of three units, each unit performing a distinct and independent function. Unit No. 1 is the circuit breaker (cut-out relay), the purpose of which is to close and open the circuit between the generator and the battery. Unit No. 2 is the current regulator, the purpose of which is to control the maximum ampere output of the generator. Unit No. 3 is the voltage regulator, the purpose of which is to hold the battery and line voltage constant within very close limits under all operating conditions.

CUT-OUT RELAY. The circuit breaker (cut-out relay) is of standard type, and the same as has been used by Auto-Lite during the past. The cut-out relays in all of the regulators, with the exception of the 22 amp capacity VRB 4003-A and the VRB-4005-A units are built with a flexible lead shunted from the cut-out "U" frame to the upper cut-out point (see Figure 2). The purpose of this flexible lead is to take the current load off the armature spring and armature hinge. Specifications for adjusting the cut-outs will be found in the tables at the end of this article.

CURRENT REGULATOR. The current regulator unit has an electro-magnet with a single winding of heavy wire. This winding is connected in series between the generator and the battery (see circuit diagram Figures 3 and 4), so that the entire output of the generator flows through it. When the generator output (ampere charging rate) reaches its predetermined maximum the regulator points are opened, thus inserting resistance in the field circuit, and reducing the generator output.

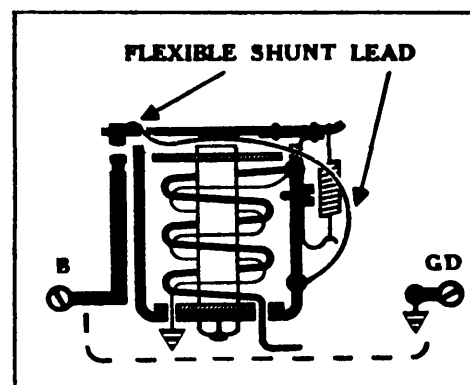


Fig. 2

Auto-Lite, Heavy Duty Circuit Breakers (Cut-out Relays) are built with a Flexible Lead, connecting the "U" Frame to the Upper Relay Points. This Shunt Lead takes the Current Load off the Armature Restraining Spring and the Armature Hinge.

As a matter of interest, the first six of the VRB series of three unit regulators to be placed on the market, were built with but a single field resistance unit. In March 1937 the VRB-4008-A unit was released. It was built with two field resistance units, so connected that when the current regulator functioned, the two resistance units were in parallel, but when the voltage regulator functioned but one high resistance unit was placed in the generator field circuit. The basic principles employed, as well as the theory of operation, for Auto-Lite two field resistance-unit regulators is the same as explained in the 1937 section of the Delco-Remy three unit type regulators, which also employ two field resistance units.

When the generator output momentarily drops, the spring tension again closes the regulator contacts, shorting out the resistance, and the generator output again arises. These cycles occur at sufficiently high frequency so that the output is limited to a steady predetermined maximum.

VOLTAGE REGULATOR. The voltage regulator unit has an electro-magnet with a single fine winding, which has a comparatively high resistance (13 ohms to be exact). This voltage winding is shunted or bridged between the insulated side of the line and ground. Actually, the voltage winding is connected across the generator main brushes; however, instead of connecting the insulated end of the voltage winding to the regulator terminal marked "A" (armature), the connection is made to the insulated "U" frame of the circuit breaker (cut-out relay).

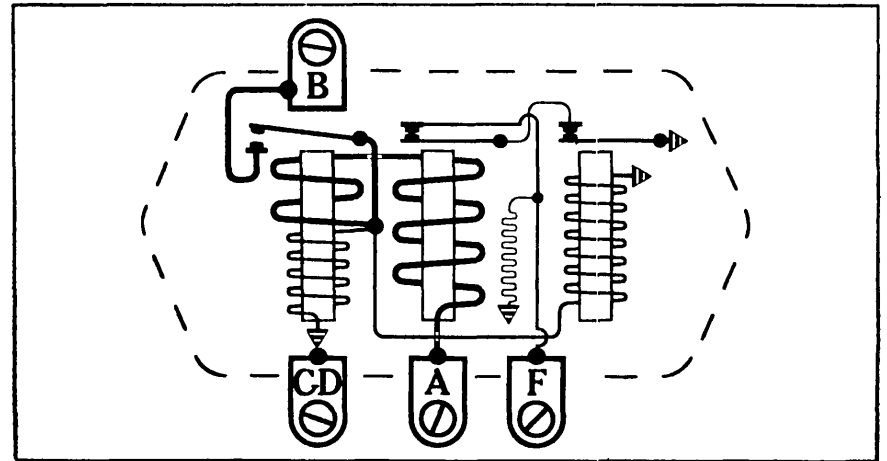


Fig. 3
Schematic Circuit Diagram of all Auto-Lite, Three Unit "VRB" Regulators, which are built with a single Field Resistance Unit.

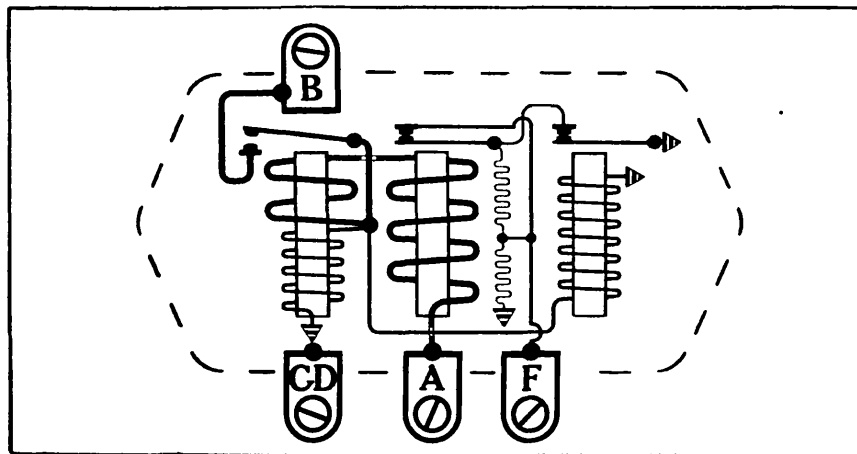


Fig. 4
Schematic Circuit Diagram of the late type Auto-Lite, Three Unit VRB-4008-A Regulator, which is built with two Field Resistance Units. The VRB-4008-A supercedes the original VRB-4002-A Regulator.

Figure 5 shows the location of the magnetic shunt, and from this figure it will be seen that the shunt extends from the core to the hinged side of the "U" frame, whereas on the "two-stage" charge regulators the shunt extended from end to end of the "U" frame. Heat compensation is necessary in order to take care of variations in battery characteristics due to temperature changes.

OPERATION OF THE VRD REGULATORS.

The VRD regulators are used with third brush regulated generators and, therefore, have but two functions to perform; namely, the closing and opening of the circuit between the generator and battery, which is done by the circuit breaker (cut-out relay), and the holding of the battery and line voltage to a safe, predetermined value. The generator output in amperes is limited by the conventional third brush action. Figure 6 shows the internal circuits of the Auto-Lite VRD series of two unit regulators. The operation of the circuit breaker and the voltage regulator is exactly the same as previously explained for the VRB regulators.

The connection is made at this point in order that the battery and line voltage, rather than the generator brush voltage will control the voltage regulator operation. When the battery and line voltage rises to a predetermined safe limit the voltage winding is sufficiently energized to cause the voltage regulator contact points to vibrate, thus cutting the generator field resistance in and out. The vibrating action is the same as that described above for the current regulator. The voltage regulators in both the Auto-Lite VRB and VRD series of regulators are temperature compensated by a "magnetic shunt". The principle of temperature compensation by a "magnetic shunt" was first employed by Auto-Lite in their 1936 series of "two-stage" charge regulators. The principle is fully explained in a previous article covering regulators of that type.

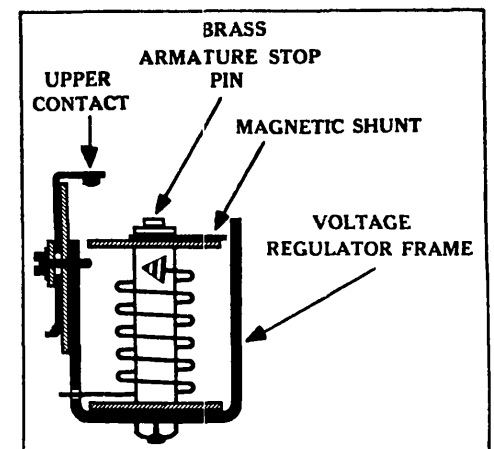


Fig. 5
The "Magnetic Shunt" used for temperature compensation on the Voltage Regulator Units.

TESTING AUTO-LITE VOLTAGE REGULATORS WHILE ON THE CAR.

In order to test regulators while they are still on the car, a mechanic will require an accurate voltmeter graduated to read within tenths of a volt, preferably with a 0-15 scale, and an accurate ammeter with a 5-0-50 ampere scale, and capable of being read to within one ampere. The ammeter should be equipped with heavy, short leads. Before making any tests on the regulator the battery should first be inspected, and its specific gravity should be 1.250 or higher. If the car battery is found to be discharged, and with a gravity of less than 1.250, a fully charged service battery should temporarily be substituted.

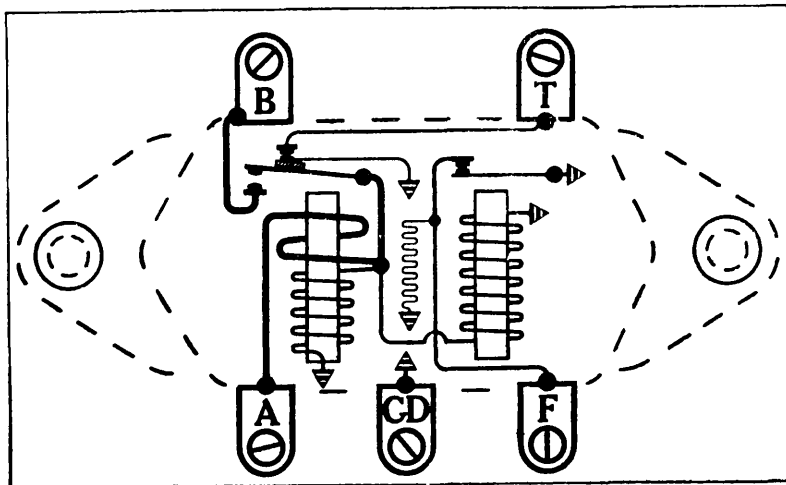


Fig. 6

Schematic Circuit Diagram of all Auto-Lite Two Unit "VRD" Regulators.

Remove the wire from the "B" terminal on the regulator, and connect the ammeter in series with terminal "B" and the wire just removed from that terminal. Connect the voltmeter across the regulator terminals "B" and "GD".

Start the engine, and set the hand throttle for an engine speed equivalent to a car speed of approximately 30 m.p.h. in high gear. Run the engine for several minutes, or until the line voltage remains constant, before taking meter readings. The ammeter should show a reading below the maximum stamped on the name plate of the regulator, and the voltmeter should show a reading in accordance with the tabulations for the regulator under test. With readings in accordance with the tabulated figures the voltage regulator unit can be passed as functioning satisfactorily. The voltage readings should be near the high limit under cold (winter) operating conditions, and near the low limit under hot (summer) operating conditions. This variation, of course, is due to the heat compensation of the voltage regulator.

If the regulator under test is a VRB, three unit instrument, the current regulator action should next be checked. The same voltmeter and ammeter connections are used when making both a voltage and current regulator test. Add an electrical load of a current value in excess of the amperes stamped on the name plate of the regulator. This load should be connected between the test ammeter and the battery. (This load may consist of a bank of standard headlight bulbs or a carbon pile as shown by "Resistance—2" Figure 9). If the current regulator is functioning correctly the test ammeter will show a reading at or very near the maximum amperes stamped on the name plate of the regulator.

TESTING AUTO-LITE VOLTAGE REGULATORS AT THE BENCH.

BENCH REPAIRS. In making regulator adjustments the work should be considered as two separate and distinct operations. The first part, outside of checking the resistances of the various windings, is purely mechanical; that is, accurately measuring the several gaps, as well as the contact spring tensions, to determine if all values fall within certain fixed limits specified by the manufacturers. These preliminary adjustments are extremely important, and should be carefully

At this time we would call your attention to the Prest-O-Lite, "Hi-Level" type batteries, which are standard equipment in all 1937 model Packard automobiles. With the electrolyte level at the star in the filler tube, the batteries are fully charged at a specific gravity of 1.250. A Prest-O-Lite battery of this type will be about half discharged and a fully charged service battery should be substituted for making regulator adjustments, when its gravity falls to 1.200.

IMPORTANT! Battery condition affects regulator operation. An old battery or a battery which is more than half discharged, or one which has just been subjected to excessive heat, will cause a high charging rate. On the other hand, a battery with hard or sulphated plates, or with high resistance separators, will cause a low charging rate.

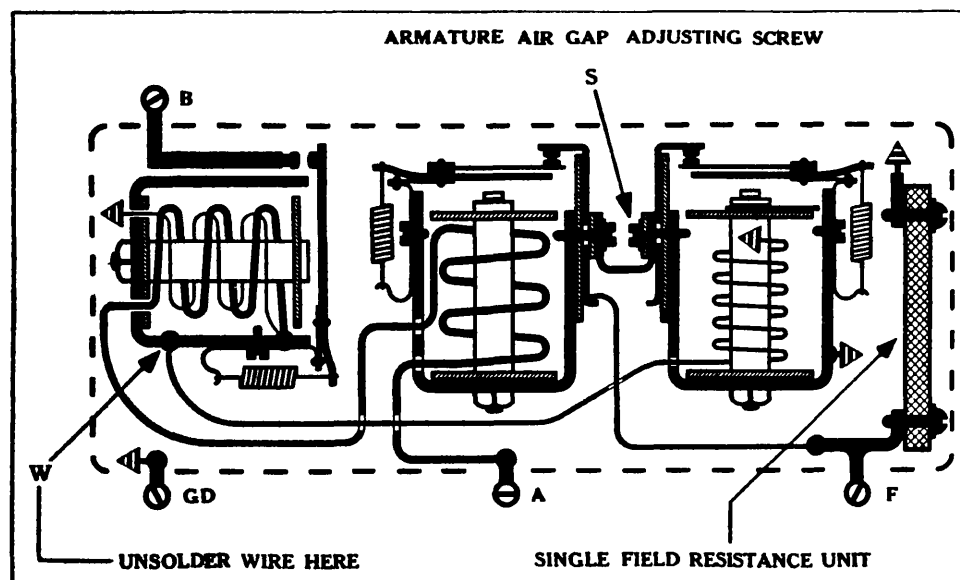


Fig. 7

The Auto-Lite, Three Unit VRB-4003-A Regulator, showing where the insulated end of the Voltage Regulator Winding is soldered to the Circuit Breaker "U" Frame. Connection "W" must be unsoldered when making Voltage Winding Resistance Tests.

made, as it will be found impossible to complete the second part of the work; that is, adjusting the unit to give proper regulation when tested with a generator, if any of the first measurements are inaccurate.

CIRCUIT BREAKER (CUT-OUT RELAY)—ADJUSTMENTS AT BENCH.

1. Check circuit breaker voltage winding. (An accurate reading ohmmeter is needed for this test.) The voltage windings on circuit breakers used in both the VRB and the VRD series of regulators have a resistance of 37.0 ohms. (A variation of plus or minus 5% is permissible.) In making this test it is necessary to disconnect the insulated voltage regulator lead from the circuit breaker "U" frame (see "W" Figure 7). The ohmmeter should be connected between the regulator terminals "A" and "GD". (Resistance in ohms is found by dividing the voltage readings by the amperage draw.)

2. Check armature air gap with the points open. The circuit breaker armature air gap on both type regulators should be between a minimum of .034 and a maximum of .038 inches. A flat type gauge should be used, and the measurements taken over the hinged end of the core. Adjust the armature air gap by bending the armature stop.

3. Check circuit breaker contact point separation. Auto-Lite specifies a minimum contact separation of .015 inches. Adjustment is made by expanding or contracting the bridge supporting the stationary contact points.

CURRENT REGULATOR—ADJUSTMENTS AT THE BENCH.

1. Check contact spring tension. NOTE: At the time of publication Auto-Lite have not, as yet, issued official figures on the contact spring tension for the VRB and VRD series of regulators. Repeated tests made by our engineers on all model VRB and VRD regulators, show that the contact point will open with an average pull of 24 ounces when the spring tension scale is hooked just below the top loop in the armature restraining spring and the pull exerted at right angles to the armature (see Figure 8). To accurately determine the instant that the regulator points separate, we recommend the use of a 6 volt test light as shown in Figure 8. The light will burn as long as the regulator contacts are closed, but will go out the instant the points open.

2. Check armature air gap at the instant the points just open. On the VRB series of current regulators the air gap should be between the minimum of .060 and the maximum of .062 inches. The Auto-Lite Co. recommend the use of a pin gauge, their parts number "ST-281-2". Measurements should be made on the regulator point side of the brass armature stop pin found in the end of the regulator magnet core. The 6 volt test light should be connected as shown in Figure 8. With the low limit pin gauge in place, depress the armature, and the light should go out or become very dim. With a high limit pin gauge in place depress the armature and the light should stay lighted. IMPORTANT! Use care in depressing the armature that you do not touch the contact point spring. Apply the downward pressure near the center of the armature. Adjustments may be made by loosening screw "S" (See Figure 7), which holds the upper regulator point. The point may then be raised or lowered, depending upon the adjustment that is to be made.

3. Check regulator point gap with the armature pressed down against the stop pin. A minimum gap of .010 and a maximum gap of .020 is specified for the VRB series of regulators. These figures are approximate only: too much variation indicates a wrong length of the brass armature stop pin, and a new unit must be substituted.

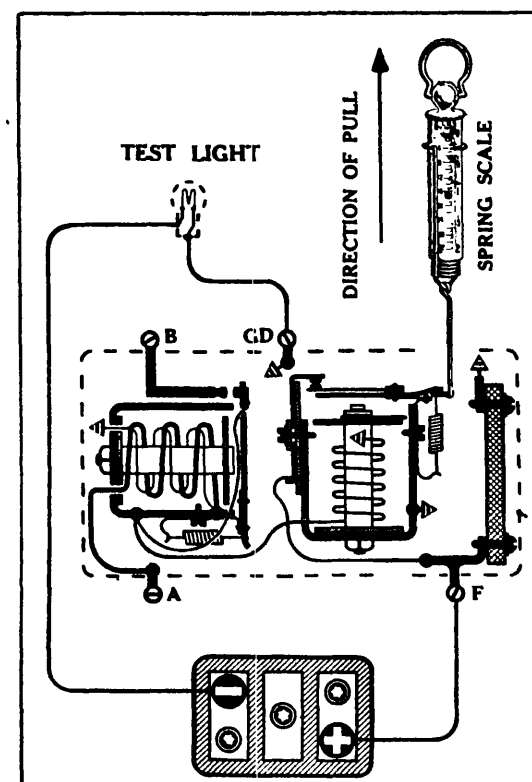


Fig. 8
Method of testing Regulator Contact Spring Tension, as recommended by our Engineers. The six volt Test Light will go out the instant the Regulator Points open.

VOLTAGE REGULATOR (ADJUSTMENTS AT THE BENCH).

1. Check the resistance of the voltage regulator winding. (An accurate reading ohmmeter is needed for this test.) The insulated end of the voltage regulator winding must be disconnected from the circuit breaker "U" frame. (See Figure 7). Measurements are taken from the insulated lead to the "GD" terminal on the regulator. A resistance of 15.0 ohms is specified for the voltage winding on both the VRB and the VRD regulators.

2. Check the voltage regulator contact spring tension. NOTE: Our engineers recommend that the voltage regulator contact spring tension should be tested in the same manner as explained in paragraph 1 under "Current Regulator". We have found by experimentation that the tension for both the current and voltage regulators is the same and averages 24 ounces.

3. Check armature air gap at the instant the points just open. On the VRB series of voltage regulators the air gap should be between the minimum of .060 and the maximum of .062 inches. The Auto-Lite Co. recommend the use of a pin gauge, their parts number "ST-281-2". Measurements should be made on the regulator point side of the brass armature stop pin found in the end of the regulator magnet core. The 6 volt test light should be connected as shown in Figure 8. With the low limit pin gauge in place, depress the armature, and the light should go out or become very dim. With a high limit pin gauge in place depress the armature and the light should stay lighted. **IMPORTANT!** Use care in depressing the armature that you do not touch the contact point spring. Apply the downward pressure near the center of the armature. Adjustments may be made by loosening screw "S" (see Figure 7), which holds the upper regulator point. The point may then be raised or lowered, depending upon the adjustment that is to be made.

4. Check regulator point gap with the armature pressed down against the stop pin. A minimum gap of .010 and a maximum gap of .020 is specified for the VRB series of regulators. These figures are approximate only: too much variation indicates wrong length armature stop pin, and a new unit must be substituted.

ELECTRICAL TESTS IN THE TEST BENCH.

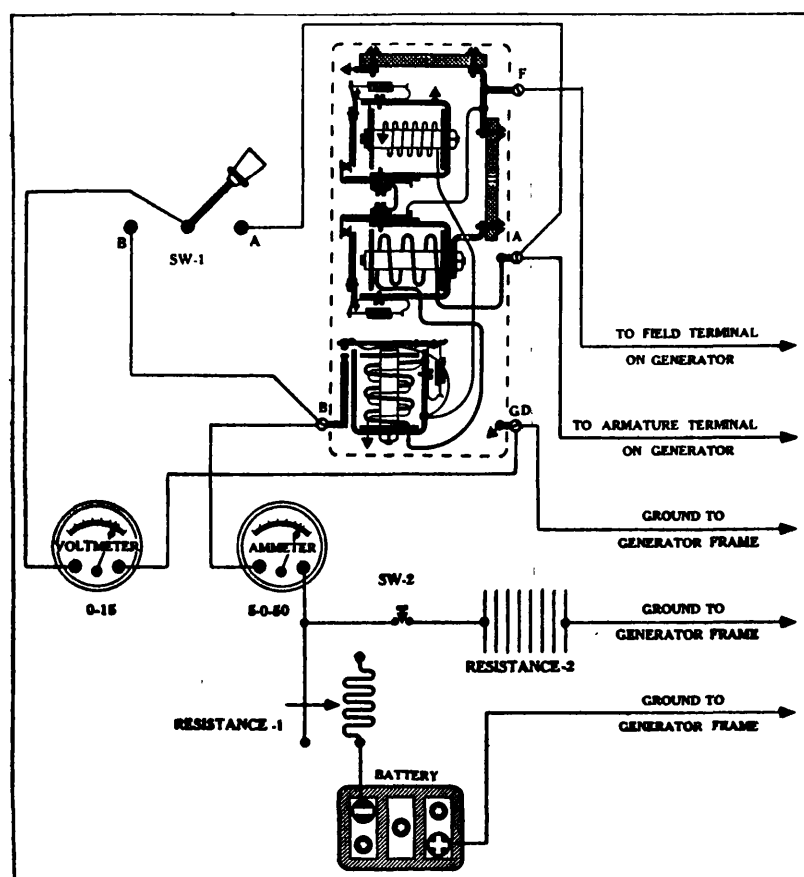


Fig. 9

Necessary Apparatus and Connections for making Regulator Tests with a Motor Driven Test Bench.

have the switch "SW-1" (See Figure 9) closed on the "A" terminal. This makes it possible to watch voltage build-up of the generator and the closing voltage of the circuit breaker. When testing either the voltage or current regulator units, have this switch closed on the "B" terminal.

After the mechanical repairs and adjustments have been completed the units are then ready for electrical tests in the test bench. Figure 9 is a circuit diagram which lists the necessary equipment, and shows the connections which should be made when it is used with a conventional, variable speed test bench. It is recommended that the car generator always be used in making test bench tests; however, it is permissible to use an Auto-Lite, type GBW generator if the car generator is not available. This may be done because of the comparatively short time the generator is in operation. The battery used in connection with test bench testing should be checked daily, and its electrolyte maintained at a specific gravity of 1.250 or higher, at all times. The following procedure is recommended.

1. Test and adjust circuit breaker (cut-out relay) when cold.
2. Test and adjust voltage regulator when hot. (To heat the regulator operate for thirty minutes with the generator charging 10 amps. for all units rated up to 30 amp. output. While heating a generator have the cover in place on the unit.)
3. Test and adjust current regulator when hot.
4. Recheck circuit breaker operation when hot.

NOTE: When testing the circuit breaker unit in regulators

CIRCUIT BREAKER CLOSING AND OPENING DATA, WHEN COLD.

Auto-Lite specifies a minimum closing voltage of 6.5, and a maximum closing voltage of 7.25 when the circuit breakers are cold. The contact points should open with a minimum discharge of .5 amperes, and a maximum discharge of 3.0 amps. To change the cut-in voltage of a circuit breaker adjust the armature spring tension. This is done by bending the lower spring bracket. To change the cut-out amperage adjust the contact point gap by raising or lowering the stationary point.

If, on the final hot recheck of the circuit breaker, the closing voltage and the open discharge amperage are not within the specified limits after having been correctly set on the cold test, it is possible that the armature hinge was improperly assembled. Check to make sure that the brass side of the armature hinge faces upward. If found to be improperly assembled replace the circuit breaker unit.

CHECKING ELECTRICAL CHARACTERISTICS OF THE VOLTAGE REGULATOR WHEN HOT.

Refer to the tables at the end of this article for electrical specifications on the unit under test.

After the voltage regulator has been heated for a 30 minute period take a "flash" voltage test. This is done by stopping the generator. The generator is then restarted, and the maximum voltage reading observed. To change the voltage readings increase or decrease the tension on the armature restraining spring by bending the lower spring arm. If adjustments are found to be necessary operate the generator for at least fifteen minutes, and then recheck with another "flash" voltage test.

CHECKING ELECTRICAL CHARACTERISTICS OF THE CURRENT REGULATOR.

With switch "SW-1" (see Figure 9) in the "B" position, depress switch "SW-2" and adjust resistances "R-1" and "R-2" until a voltage reading of 6.8 to 7.2 volts results. Increase the speed of the test generator, and observe the reading of the ammeter. With a proper current regulator adjustment the generator charging rate should be held within plus or minus 1 ampere of the maximum ampere figure stamped on the name plate on the regulator. To change the current regulator characteristics increase or decrease the tension on the armature restraining spring by bending the lower spring arm.

Trouble Shooting Chart for Auto-Lite Series "VRB" and "VRD" Vibrating-Point Regulators

APPARENT TROUBLE

1. No voltage control.

PROBABLE CAUSE	PROCEDURE FOR CHECKING	REMEDY
A. Open voltage regulator, voltage winding.	<p>Measure the resistance between regulator terminals "A" and "GD". At room temperature the resistance will be approximately 10 ohms, if the voltage windings on both the circuit breaker and the voltage regulator are in good condition. If the voltage regulator winding is open circuited the resistance will be approximately 38 ohms (the resistance of the circuit breaker voltage winding alone). If the circuit breaker voltage winding is open, the resistance will be approximately 13 ohms (the resistance of the voltage winding on the voltage regulator alone).</p> <p>NOTE: An accurate ohmmeter or Wheatstone bridge should be used in making the above test.</p>	If the broken wire is inside of the coil, replace the defective unit. If the break is external it may be corrected by splicing.
B. Sticking voltage regulator points.	<p>Increase the generator output. A voltmeter connected between regulator terminals "B" and "GD" will drop three or more tenths the moment the voltage regulator starts to operate.</p>	<p>First clean the voltage regulator points with carbon tetrachloride, using a clean cloth, and rubbing each point briskly. Be sure no lint is left between points. If this does not improve the voltage regulator operation use a very fine point-file and file the contact points very lightly, moving the file parallel and lengthwise to the armature. After filing, again clean the points with carbon tetrachloride.</p>

APPARENT TROUBLE

1. No voltage control (continued).

PROBABLE CAUSE	PROCEDURE FOR CHECKING	REMEDY
C. Voltage regulator, stationary contact support grounded to the regulator "U" frame.	Disconnect the generator field lead from regulator terminal "F". Insert a six volt head lamp bulb between regulator terminals "B" and "F". Press down on regulator armature and open the regulator contact points. If the regulator is in good condition the light should go out. If the light remains burning look for—(1). A shorted regulator "F" terminal; (2). A grounded lead from the regulator "F" terminal to the upper regulator contact; (3). An upper contact bracket shorted to the regulator "U" frame; (4). In case a current regulator is also part of the unit, check for a current regulator "U" frame grounded to the regulator base.	Remove grounds or install new parts, if necessary.
D. "F" terminal on regulator grounded.	Same as 1-C.	Same as 1-C.
E. The lead which runs from the "F" terminal in the regulator to the upper contact support on the current regulator is grounded.	Same as 1-C.	Same as 1-C.

2. Improper voltage control.

A. Voltage winding on the voltage regulator is partially short circuited.	Same as 1-A.	Replace unit.
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3. Excessive fluctuation of ammeter.*

*NOTE: The ammeter will have a tendency to fluctuate somewhat at the moment the voltage regulator points start to operate. This fluctuation will decrease with a slight increase in generator speed providing the voltage regulator is functioning properly.

A. Dirty or high resistance (oxidized) voltage regulator points.	Failure of the ammeter to stop fluctuating as the generator speed is increased, usually indicates dirty or oxidized voltage regulator points.	Same as 1-B.
B. Sticking voltage regulator points.	Same as 1-B.	Same as 1-B.
C. Broken regulator field resistance unit.	Make a visual inspection.	Replace with a field resistance unit with the proper resistance, and clean the voltage regulator points, as outlined in 1-B.
D. Wrong voltage regulator field resistance unit.	Make a visual inspection.	Replace with a field resistance unit with the proper resistance, and clean the voltage regulator points, as outlined in 1-B.
E. Hinge on armature of either the voltage regulator or the current regulator not tight against the armature.	Remove the armature restraining spring, and make a visual inspection. If light can be seen between the armature and the hinge, the unit is defective.	Replace the unit.
F. Dirty or high resistance (oxidized) current regulator points.	Same as 3-A.	Same as 1-B.

APPARENT TROUBLE

3. Excessive fluctuation of ammeter (continued).

PROBABLE CAUSE	PROCEDURE FOR CHECKING	REMEDY
G. The circuit breaker points open at a discharge amperage too close to zero.	Ground the regulator "F" terminal to base, and connect an ammeter in the battery line at regulator terminal "B". Vary the speed of the generator, and note the ampere discharge when the circuit breaker points open. If the circuit breaker is functioning properly the points should open with a discharge of from .5 to 3.0 amps.	Readjust height of stationary points if no other trouble is found.

4. Intermittent operation of the circuit breaker (cut-out relay).

A. Dirty or high resistance (oxidized) voltage regulator or current regulator points.	Failure of the ammeter to stop fluctuating as the generator speed is increased, usually indicates dirty or oxidized voltage regulator points.	Same as 1-B.
B. The circuit breaker (cut-out relay) points open at a discharge amperage too close to zero.	Same as 3-G.	Same as 3-G.

5. Excessive generator speed before circuit breaker (cut-out relay) points close.

A. Dirty or high resistance (oxidized) voltage regulator or current regulator points.	Failure of the ammeter to stop fluctuating as the generator speed is increased, usually indicates dirty or oxidized voltage regulator points.	Same as 1-B.
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6. A decided drop in the line voltage when the voltage regulator starts to function.

A. Sticky voltage regulator points.	Same as 1-B.	Same as 1-B.
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7. Too high or too low operating voltages.

A. Incorrectly adjusted voltage regulator armature air gap.	<p>Check the voltage regulator armature air gap with Auto-Lite pin gauge (ST-281-2). If the .0595 end of the pin gauge is inserted between the regulator core and the armature on the point side of the brass armature stop pin, in a plane parallel to the top of the core and the armature, and the armature then carefully depressed by finger, the generator should stop charging. If the .0625 end of the pin gauge is inserted in the same manner the generator charging rate should increase. If the generator charging rate increases when the small end of the pin gauge is inserted between the core and the armature, the armature air gap is too close. If, on the other hand, the generator stops charging when the large end of the pin is inserted and the armature is depressed by finger, the gap is too wide.</p> <p>NOTE: This is substantially the same test as explained in paragraph 3, under the heading "Voltage Regulator (Adjustments at the Bench)", found earlier in this article, the only difference being that the generator charging rate instead of a test lamp, is used as an indicator.</p>	<p>Loosen the screw (see "S", Fig. 7) that holds the stationary point bracket to the regulator "U" frame just enough to permit the bracket to be moved. Move the stationary point bracket upwards to increase the armature air gap, and downwards to decrease the gap. Inspect the regulator points for alignment when the adjustment is completed, and make sure that screw "S" is re-tightened.</p>
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APPARENT TROUBLE

7. Too high or too low operating voltages (continued).

PROBABLE CAUSE	PROCEDURE FOR CHECKING	REMEDY
B. Too high or too low a voltage regulator operating adjustment.	Check voltage across regulator terminals "B" and "GD".	Check the regulator armature air gap, as in 7-A. If found to be correct check the resistances of the regulator voltage winding, as in 1-A. Check for sticking voltage regulator points as in 1-B. Check for short-circuited voltage regulator voltage windings, as in 2-A. If above tests show regulator to be in an operating condition then adjust the tension of the armature restraining spring.
C. High resistance in voltage regulator, voltage winding.	Check voltage across regulator terminals "B" and "GD".	Same as 7-B. NOTE: High resistances usually result from poorly soldered connections.

8. Improper voltage control at high speeds.

A. A broken regulator field resistance unit.	Make a visual inspection.	Replace with a field resistance unit with the proper resistance, and clean the voltage regulator points as outlined in 1-B.
B. Wrong regulator field resistance unit.	Make a visual inspection.	Same as 8-A.

9. Generator does not charge.

A. Too low a voltage setting.	Check voltage across regulator terminals "B" and "GD".	Same as 7-B.
B. Current regulator series winding open circuited.	Check the voltage between regulator terminals "A" and "GD". If the winding is open the voltage reading will be above 8.0, and the circuit breaker (cut-out relay) points will not close. Short out the winding with a jump lead from the "A" terminal to the circuit breaker "U" frame. If the ammeter then shows "charge" the open will probably be found at one of the soldered connections on either the current regulator or the circuit breaker.	If a broken wire is found replace the unit. If defective soldering, resolder.
C. Dirty circuit breaker (cut-out relay) points.	Make a visual inspection. If the points are at fault they will show discoloration and pitting.	Same as 1-B.
D. Burned circuit breaker (cut-out relay) points.	Make a visual inspection. If the points are at fault they will show discoloration and pitting.	Same as 1-B.
E. Open series winding on circuit breaker (cut-out relay).	Same as 9-B.	If a broken wire is found replace the unit. If defective soldering, resolder.
F. Grounded regulator "A" terminal.	Remove the wire from the regulator "A" terminal. Connect a voltmeter between this wire and ground, and operate the generator at approximately 2000 R. P. M. If the generator "builds up" it is evidence of a ground within the regulator itself. It may be either in the regulator "A" terminal, a ground in the series winding on either the current regulator or the circuit breaker units, or it may be a ground in the circuit breaker assembly itself.	Eliminate ground, if possible. Otherwise replace necessary units.

APPARENT TROUBLE

9. Generator does not charge (continued).

PROBABLE CAUSE	PROCEDURE FOR CHECKING	REMEDY
G. Grounded circuit breaker (cut-out relay).	Same as 9-F.	Same as 9-F.
H. Improperly adjusted circuit breaker (cut-out relay) armature air gap.	Check circuit breaker armature air gap with points open, as outlined in paragraph 2, under the heading "Circuit Breaker (Cut-Out Relay) Adjustments at Bench", found earlier in this article.	Adjust the air gap between core and armature with the points open. Re-adjust tension on the armature restraining spring for proper closing voltage. Re-adjust the height of stationary contact points for proper current discharge at the moment of point opening, if such is found necessary.
I. Circuit breaker (cut-out relay) closing voltage set too high.	Ground the regulator "F" terminal to the base, and connect a voltmeter across regulator terminals "A" and "GD". By varying the generator speed check closing voltage of the circuit breaker, as indicated by a drop in the voltage reading. The closing voltage should be between 6.4 and 7.0 volts. If this test shows the closing voltage of the circuit breaker to be correct make the following checks in the order given: 12-B, 9-C, 10b-C, 9-E, 9-F, 9-G, 9-H, 15-B.	Re-adjust circuit breaker armature restraining spring if no other trouble is apparent.

10. Improper charging rate.

10a. TOO HIGH.

A. Too high a voltage setting.	Check voltage across regulator terminals "B" and "GD". If found to be too high it may be the result of a high resistance in the voltage regulator voltage winding.	Same as 7-B.
B. High resistance in voltage regulator, voltage winding.	Check voltage across regulator terminals "B" and "GD".	Same as 7-B. NOTE: High resistances usually result from poorly soldered connections.
C. Current regulator, series winding short-circuited.	There is no direct test. This trouble can probably be located by the process of elimination, by proceeding as follows:—Carefully check the current regulator armature air gap. If the air gap is found to be in adjustment, check to see if the current regulator stationary contact support is grounded to the current regulator "U" frame. Follow the procedure as outlined in 1-C.	If possible, remove the short; otherwise, replace the unit.
D. Incorrectly adjusted current regulator armature air gap.	Check the current regulator armature air gap with Auto-Lite pin gauge (ST-281-2). If the .0595 end of the pin gauge is inserted between the regulator core and the armature, on the point side of the brass armature stop pin in a plane parallel to the top of the core and the armature, and the armature then carefully depressed by finger, the generator should stop charging. NOTE: This is only true of regulators with but a single field resistance unit. On regulators with two field resistance units, such as the VRB-4008-A regulator, the charging rate will drop approximately one-half.	Loosen the screw (see "S", Fig. 7) that holds the stationary point bracket to the regulator "U" frame just enough to permit the bracket to be moved. Move the stationary point bracket upwards to increase the armature air gap, and downwards to decrease the gap. Inspect the regulator points for alignment when the adjustment is completed, and make sure that screw "S" is re-tightened.

(Continued on next page)

APPARENT TROUBLE

10a. TOO HIGH (continued).

PROBABLE CAUSE	PROCEDURE FOR CHECKING (Continued)	REMEDY
	<p>If the .0625 end of the pin gauge is inserted in the same manner the generator charging rate should increase. If the generator charging rate increases when the small end of the pin gauge is inserted between the core and the armature, the armature air gap is too close. If, on the other hand, the generator stops charging when the large end of the pin is inserted, and the armature depressed by finger, the gap is too wide.</p> <p>NOTE: This is substantially the same test as explained in paragraph 2, under the heading, "Current Regulator (Adjustments at the Bench)", found earlier in this article, the only difference being that the generator charging rate, instead of a test lamp, is being used as an indicator.</p>	
E. Sticking current regulator points.	Operate the generator at a speed of approximately 2600 R.P.M. Increase the generator output by adding a load to the battery. This may be done with a lamp bank, as previously explained. If the regulator points are sticking, the generator output will rise 3 or 4 amperes above the normal regulator setting, before the regulator starts to operate.	Same as 1-B.
F. Current regulator stationary contact point grounded to regulator "U" frame.	Same as 1-C.	Same as 1-C.
G. Too high a current regulator setting.	Check the current regulator armature core gap; also check for a short-circuited series winding on the current regulator, as outlined in 10a-C.	Adjust current regulator armature restraining spring tension, if no other defects are found.

10b. TOO LOW.

A. Incorrectly adjusted current regulator armature air gap.	Same as 10a-D.	Same as 10a-D.
B. Too low a current regulator setting.	Check the current regulator armature air gap, as outlined in 10a-D.	Adjust armature restraining spring tension, if air gap is found to be correct.
C. High resistance (oxidized) current regulator contacts.	Make a visual inspection. If the points are at fault they will show discoloration and pitting.	Same as 1-B.

11. Regulator has no control over generator output.

A. "F" terminal on regulator grounded.	Same as 1-C.	Same as 1-C.
B. The lead which runs from the "F" terminal in the regulator to the upper contact on the current regulator is grounded.	Same as 1-C.	Same as 1-C.
C. Current regulator stationary contact support grounded to the regulator "U" frame.	Same as 1-C.	Same as 1-C.

APPARENT TROUBLE

11. Regulator has no control over generator output (continued).

PROBABLE CAUSE	PROCEDURE FOR CHECKING	REMEDY
D. The current regulator "U" frame grounded to regulator base.	Same as 1-C.	Eliminate the ground. Use new insulating washers, where necessary.

12. The circuit breaker (cut-out relay) fails to operate.

A. Voltage winding on circuit breaker (cut-out relay) is short-circuited.	Same as 1-A.	Replace complete circuit breaker assembly.
B. Voltage winding on circuit breaker (cut-out relay) is open-circuited.	Same as 1-A.	If the broken wire is inside the coil replace the defective unit. If the break is external it may be corrected by splicing.

13. Ammeter shows a heavy discharge when the engine is not running and there is no electrical load.

A. Sticking circuit breaker (cut-out relay) points.	The ammeter will show no discharge if the wire is removed from regulator terminal "B". The ammeter will show a slight discharge if the wire is removed from regulator terminal "A".	Same as 1-B.
B. Improperly adjusted air gap on the circuit breaker (cut-out relay).	Same as 9-H.	Same as 9-H.

14. Ammeter shows a continuous high discharge even though the wire is removed from regulator terminal "A".

A. Grounded "B" terminal on the regulator.	The discharge can only be eliminated by removing the wire from regulator terminal "B".	If possible, remove the ground; otherwise replace necessary units.
B. A grounded stationary contact support in the circuit breaker (cut-out relay).	Same as 14-A.	Same as 14-A.

15. The circuit breaker (cut-out relay) operation is erratic.

A. Improperly adjusted circuit breaker (cut-out relay) armature air gap.	Same as 9-H.	Same as 9-H.
B. Circuit breaker (cut-out relay) armature hinge assembled upside down.	Make a visual inspection. The brass side should be up.	Replace unit.
C. Circuit breaker (cut-out relay) armature not floated.	Remove circuit breaker armature restraining spring. If this is done at room temperature, the armature should appear to float, so that it does not touch the upper stop, and the circuit breaker contact points should be open.	With the unit at room temperature, and the restraining spring removed, and with no electrical connections made to the unit, the two ears on the hinge bracket should be evenly adjusted so that the armature floats between the brass upper stop and the stationary contact point.

APPARENT TROUBLE

16. Circuit breaker (cut-out relay) points flutter.

PROBABLE CAUSE	PROCEDURE FOR CHECKING	REMEDY
A. Closing voltage is too low.	Make the following tests in the order listed:— 9-I, 9-H, 1-A, and 15-B.	Same as 9-I.
B. The circuit breaker (cut-out relay) points open at a discharge amperage too close to zero.	Ground the regulator "F" terminal to base, and connect an ammeter in the battery line at regulator terminal "B". Vary the speed of the generator, and note the ampere discharge when the circuit breaker points open. If the circuit breaker is functioning properly the points should open with a discharge of from .5 to 3.0 amps.	Re-adjust height of stationary points if no other trouble is found.
C. Circuit breaker (cut-out relay) points open, while generator is still charging.	Same as 16-B.	Same as 16-B.

17. Ammeter shows a momentary high discharge when engine is stopped and before the circuit breaker (cut-out relay) contacts open.

A. Improperly adjusted circuit breaker (cut-out relay) armature air gap or armature restraining spring.	Same as 16-B.	Same as 16-B.
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18. Generator indicator or "tell-tale" light will not operate.

A. The circuit through the auxiliary pair of grounding points on the top of the circuit breaker (cut-out relay) armature is open.	With the ignition switch "ON" and the engine not running, ground the "T" terminal on the regulator. If the lamp lights the trouble may be that the auxiliary set of contacts are dirty, or there is an open circuit either between the regulator "T" terminal and the upper auxiliary contact point support, or there is a break or a poor connection in the flexible lead which connects the lower auxiliary contact to the grounded voltage regulator "U" frame.	Repair or replace.
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19. Generator indicator or "tell-tale" light burns continuously.

A. The circuit through the auxiliary pair of grounding points on the top of the circuit breaker (cut-out relay) armature is grounded.	With the ignition switch "ON" and the generator charging, remove the wire from the regulator "T" terminal. If the light goes out that circuit is shorted in the regulator. Check for a grounded "T" terminal.	Eliminate the ground.
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20. Burned and pitted voltage regulator or current regulator points.

A. Broken regulator field resistance unit.	Make a visual inspection.	Replace with a field resistance unit, with the proper resistance, and clean the voltage regulator points, as outlined in 1-B.
B. Wrong regulator field resistance unit.	Make a visual inspection.	Same as 20-A.

APPARENT TROUBLE

21. Circuit breaker (cut-out relay) points do not close.

PROBABLE CAUSE	PROCEDURE FOR CHECKING	REMEDY
A. Current regulator series winding is open.	Check the voltage between regulator terminals "A" and "GD". If the winding is open the voltage reading will be above 8.0, and the circuit breaker (cut-out relay) points will not close. Short out the winding with a jump lead from the "A" terminal to the circuit breaker "U" frame. If the ammeter then shows "charge" the open will probably be found at one of the soldered connections on either the current regulator or the circuit breaker.	If a broken wire is found replace the unit. If defective soldering, resolder.
B. Voltage winding on circuit breaker is short-circuited.	Same as 1-A.	Same as 12-A.
C. Voltage winding on circuit breaker (cut-out relay) is open-circuited.	Same as 1-A.	Same as 12-B.
D. Series winding on circuit breaker (cut-out relay) is open-circuited.	Same as 21-A.	If a broken wire is found replace the unit. If defective soldering, resolder.
E. Grounded regulator "A" terminal.	Remove the wire from the regulator "A" terminal. Connect a voltmeter between this wire and ground, and operate the generator at approximately 2000 R. P. M. If the generator "builds up" it is evidence of a ground within the regulator itself. It may be either in the regulator "A" terminal, a ground in the series winding on either the current regulator or the circuit breaker units, or it may be a ground in the circuit breaker assembly itself.	Eliminate ground, if possible. Otherwise replace necessary units.
F. Grounded circuit breaker (cut-out relay).	Same as 21-E.	Same as 21-E.

AUTO-LITE CONTROL UNITS' SPECIFICATIONS.

REGULATOR MODEL	TYPE OF UNIT	FIELD RESISTANCE UNIT		VOLTAGE CONTROL UNIT				CURRENT CONTROL UNIT				CUT-OUT RELAY			
		AUTO-LITE PARTS NO.	MARKED	CONTACT SPRING TENSION (OUNCES)	GAP BETWEEN CORE AND UNDER SIDE OF ARMATURE (WHEN CONTACT POINTS JUST OPEN)	CONTACT OPENING (ARMATURE PRESSED DOWN AGAINST STOP PIN)	VOLTAGE SETTING 70° F.	CONTACT SPRING TENSION (OUNCES)	GAP BETWEEN CORE AND UNDER SIDE OF ARMATURE (WHEN CONTACT POINTS JUST OPEN)	CONTACT OPENING (ARMATURE PRESSED DOWN AGAINST STOP PIN)	SETTING 70° F. (AMPS.)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS. DISCHARGE)	CONTACT GAP (POINTS OPEN)	ARMATURE AIR GAP (POINTS OPEN)
VRB-4002-A	V. V. C.	TC-51-M	60	24	.060 to .062	.010 to .020	7.4 to 7.9	24	.060 to .062	.010 to .020	30	6.5 to 7.25	.5 to 3.0	.015 min.	.034 to .038
VRB-4002-C	V. V. C.	TC-51-M	60	24	.060 to .062	.010 to .020	7.4 to 7.9	24	.060 to .062	.010 to .020	25	6.5 to 7.25	.5 to 3.0	.015 min.	.034 to .038
VRB-4002-D	V. V. C.	TC-51-L	30	24	.060 to .062	.010 to .020	7.4 to 7.9	24	.060 to .062	.010 to .020	28	6.5 to 7.25	.5 to 3.0	.015 min.	.034 to .038
VRB-4003-A	V. V. C.	TC-51-L	30	24	.060 to .062	.010 to .020	7.4 to 7.9	24	.060 to .062	.010 to .020	22	6.5 to 7.25	.5 to 3.0	.015 min.	.034 to .038
VRB-4004-B	V. V. C.	TC-51-L	30	24	.060 to .062	.010 to .020	7.4 to 7.9	24	.060 to .062	.010 to .020	28	6.5 to 7.25	.5 to 3.0	.015 min.	.034 to .038
VRB-4005-A	V. V. C.	TC-51-L	30	24	.060 to .062	.010 to .020	7.4 to 7.9	24	.060 to .062	.010 to .020	22	6.5 to 7.25	.5 to 3.0	.015 min.	.034 to .038
VRB-4008-A*	V. V. C.	TC-51-M† TC-51-R	60 11	24	.060 to .062	.010 to .020	7.4 to 7.9	24	.060 to .062	.010 to .020	30	6.5 to 7.25	.5 to 3.0	.015 min.	.034 to .038
VRD-4001-A	V. V.	TC-51-L	30	24	.060 to .062	.010 to .020	7.4 to 7.9					6.5 to 7.25	.5 to 3.0	.015 min.	.034 to .038
VRD-4002-A	V. V.	TC-51-L	30	24	.060 to .062	.010 to .020	7.4 to 7.9					6.5 to 7.25	.5 to 3.0	.015 min.	.034 to .038
VRD-4003-A	V. V.	TC-51-L	30	24	.060 to .062	.010 to .020	7.4 to 7.9					6.5 to 7.25	.5 to 3.0	.015 min.	.034 to .038
VRD-4003-B†	V. V.	TC-51-L	30	24	.060 to .062	.010 to .020	7.7 to 8.2					6.5 to 7.25	.5 to 3.0	.015 min.	.034 to .038

ABBREVIATIONS: V.V. means Vibrating Voltage.

ABBREVIATIONS: V.V.C. means Vibrating Voltage Current.

NOTE: The VRB-4008-A Regulator supercedes the VRB-4002-A unit.

†NOTE: The VRD-4003-B Regulator supercedes the VRD-4003-A unit.

†Two Field Resistance Units used. With Regulator off, and turned over, when assembled Resistance 60 bridges supports of same height. Resistance 11 bridges the high support and one end of 60, with flat washer between.

Remove and discard your old page -- Tech. Sec., "Generator Charge Regulators" 19, as well as the four pages of Delco-Remy Control Units specifications, all of which material is now obsolete. Replace with 1937 Tech. Sec., pages 93 to 101 inclusive

DELCO-REMY CONTROL UNITS' SPECIFICATIONS.

STEP-VOLTAGE REGULATORS, VIBRATING-POINT CURRENT AND VOLTAGE REGULATORS.

Data revised June 1, 1937 to conform with Delco-Remy Specifications (1R-185, date of 5-20-37).

				VOLTAGE CONTROL UNIT								CURRENT CONTROL UNIT					CUT-OUT RELAY					
REGULATOR NUMBER	BAT. TERMINAL GROUNDED	TYPE OF UNIT	DELCO-REMY TEST NUMBER	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	ARMATURE TRAVEL (INCHES)	OPEN CIRCUIT VOLTAGE	VOLTAGE SETTING 70° F. WITH GENERATOR CHARGING FROM 8 TO 10 AMPS	POINTS OPEN 70° F. (VOLTS)	POINTS CLOSE 70° F. (VOLTS)	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OFFNING (INCHES)	SETTING 70 F (AMPS.)	AIR GAP (INCHES)	POINT OPENING (INCHES)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS.)	
5524	P	Vibrating voltage	324				.012-.015		14.75-15.0										.055-.060	.020-.025	13-14	0-3.0
5525	P	Vibrating volt & cur.	327				.012-.015		14.75-15.0								.012-.015	40	.055-.060	.020-.025	13-14	0-3.0
5526	P	Vibrating volt & cur.	326				.012-.015		14.75-15.0								.012-.015	40	.055-.060	.020-.025	13-14	0-3.0
5528		Vibrating voltage	339				.012-.015		7.5 - 8.0										.055-.060	.020-.025	6.5 - 7.0	0-3.0
5529	P	Vibrating volt & cur.	342				.012-.015		14.75-15.0								.012-.015	18	.055-.060	.020-.025	13-14	0-3.0
5530	P	Vibrating volt & cur.	279				.012-.015		14.75-15.0								.012-.015	50	.055-.060	.020-.025	13-14	0-3.0
5531	P	Vibrating volt & cur.	1298			.018-.020	.005-.008		14.75-15.0								.012-.015	80	.050	.020-.025	13-14	0-3.0
5532	P	Vibrating current	5532															5	.057	.020-.025	13.0 -14.0	0-3.0
5533	P	Vibrating voltage	1210				.012-.015		8.3 - 8.5										.055-.060	.020-.025	6.5 - 7.0	0-3.0
5534	P	Vibrating voltage	1403				.012-.015		8.3 - 8.5										.055-.060	.020-.025	6.5 - 7.0	0-3.0
5535	P	Vibrating voltage	824				.012-.015		14.75-15.0										.055-.060	.020-.025	13-14	0-3.0
5536	P	Vibrating voltage	324				.012-.015		14.75-15.0										.055-.060	.020-.025	13-14	0-3.0
5538	P	Vibrating voltage	1403				.012-.015		8.3 - 8.5										.055-.060	.020-.025	6.5 - 7.0	0-3.0
5539		Two Step voltage	1227			.050-.060	.015-.020				8.5 - 8.9	7.0-7.5							.012-.017	.015-.025	6.75- 7.5	0-2.5
5540		Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0

IMPORTANT! Refer to footnote found on the last page of this section for data on a new series of thickness gauge limits adopted by the United Motors Service for making regulator adjustments. Voltage readings should always be taken with cover in place on the control unit. After making adjustments, decrease engine speed until cut-out relay points open; then gradually increase engine speed until points again close, before taking final voltage readings.

A — Measure air gap with armature pressed down until fiber bumper just touches stop.

B — Generator delivers 19-22 amp. with 11 amp. lamp load.

C — Generator delivers 11-13 amp. with 7 amp. lamp load.

D — Generator delivers 10-12 amp. with 7 amp. lamp load.

E — Operate Generator at 2800 to 3000 R.P.M. Connect voltmeter between terminal marked "Ign" and ground.

F — Operate Generator at 2800 to 3400 R.P.M. Connect voltmeter between terminal marked "Ign" and ground.

G — While making voltage regulator tests short circuit Current Regulator with "jumper" across contact points. Connect voltmeter between terminal marked "Ign" and ground.

H — Connect voltmeter between terminal marked "Gen" and ground.

DELCO-REMY CONTROL UNITS' SPECIFICATIONS.—(Continued)

Data revised June 1, 1937 to conform with Delco-Remy Specifications (1R-185, date of 5-20-37).

				VOLTAGE CONTROL UNIT								CURRENT CONTROL UNIT					CUT-OUT RELAY					
REGULATOR NUMBER	BAT. TERMINAL GROUNDED	TYPE OF UNIT	DELCO-REMY TEST NUMBER	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	ARMATURE TRAVEL (INCHES)	OPEN CIRCUIT VOLTAGE	VOLTAGE SETTING 70° F. WITH GENERATOR CHARGING FROM 8 TO 10 AMPS	POINTS OPEN 70° F (VOLTS)	POINTS CLOSE 70° F (VOLTS)	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	SETTING 70° F (AMPS.)	AIR GAP (INCHES)	POINT OPENING (INCHES)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS.)	
5541	-	Vibrating current	1281										2.0-2.5	.006-.008	A .055-.060	.015-.025	B 13-16	.012-.017	.015-.025	6.75- 7.25	0-3.0	
5542	-	Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0
5543	-	Vibrating current	1286										2.0-2.5	.006-.008	A .055-.060	.015-.025	C 7.5-8.5	.012-.017	.015-.025	6.75- 7.25	0-3.0	
5544	-	Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0
5545	-	Vibrating current	1287										2.0-2.5	.006-.008	A .055-.060	.015-.025	D 6.5-7.5	.012-.017	.015-.025	6.75- 7.25	0-3.0	
5546	-	Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0
5548	-	Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0
5549	-	Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0
5550	-	Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0
5551	-	Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0
5554	-	Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0
5555	-	Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0
5556	-	Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0
5557	N	Vibrating voltage	1294	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir- cuit only	E 7.55-7.85									.018-.022	.018-.025	H 6.5 - 7.0	0-3.0
5558	-	Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0

IMPORTANT! Refer to footnote found on the last page of this section for data on a new series of thickness gauge limits adopted by the United Motors Service for making regulator adjustments. Voltage readings should always be taken with cover in place on the control unit. After making adjustments, decrease engine speed until cut-out relay points open; then gradually increase engine speed until points again close, before taking final voltage readings.

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C — Generator delivers 11-13 amp. with 7 amp. lamp load.

D — Generator delivers 10-12 amp. with 7 amp. lamp load.

E — Operate Generator at 2800 to 3000 R.P.M. Connect voltmeter between terminal marked "Ign" and ground.

F — Operate Generator at 2800 to 3400 R.P.M. Connect voltmeter between terminal marked "Ign" and ground.

G — While making voltage regulator tests short circuit Current Regulator with "jumper" across contact points. Connect voltmeter between terminal marked "Ign" and ground.

H — Connect voltmeter between terminal marked "Gen" and ground.

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DELCO-REMY CONTROL UNITS' SPECIFICATIONS.—(Continued)*Data revised June 1, 1937 to conform with Delco-Remy Specifications (1R-185, date of 5-20-37).*

				VOLTAGE CONTROL UNIT								CURRENT CONTROL UNIT					CUT-OUT RELAY					
REGULATOR NUMBER	BAT. TERMINAL GROUNDED	TYPE OF UNIT	DELCO-REMY TEST NUMBER	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	ARMATURE TRAVEL (INCHES)	OPEN CIRCUIT VOLTAGE	VOLTAGE SETTING 70° F. WITH GENERATOR CHARGING FROM 8 TO 10 AMPS	POINTS OPEN 70° F (VOLTS)	POINTS CLOSE 70° F (VOLTS)	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	SETTING 70° F (AMPS.)	AIR GAP (INCHES)	POINT OPENING (INCHES)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS.)	
5559	P	Vibrating volt & cur.	1300	8.5	.007-.010	A	.015-.025	-	Set on closed cir- cuit only	F, G 7.55-7.85			3.5	.007-.010	A	.015-.025	20-22		.018-.022	.018-.025	H 6.5 - 7.0	0-3.0
5560	-	Two Step voltage	1289	.7- .9		.028-.040	.008-.013	.028-.040			15.5 -16.25	14-15			-				.012-.017	.015-.025	13.2 -14.0	0-3.5
5561	-	Vibrating volt & cur.	1288	-	-	-	.012-.015		29.5 -30.0							.012-.015	14		.055-.060	.020-.025	26-27	0-3.0
5562	-	Vibrating volt & cur.	1292				.012-.015		29.5 -30.0							.012-.015	10		.055-.060	.020-.025	26-27	0-3.0
5563	P	Vibrating voltage	324	-	-		.012-.015		14.75-15.0										.055-.060	.020-.025	13-14	0-3.0
5564	-	Vibrating volt & cur.	279	-	-	-	.012-.015		14.75-15.0							.012-.015	50		.055-.060	.020-.025	13-14	0-3.0
5565	-	Vibrating volt & cur.	1290	-	-	-	.012-.015		29.5 -30.0							.012-.015	25		.055-.060	.020-.025	26-27	0-3.0
5566	P	Vibrating volt & cur.	1425	-	-	-	.012-.015		14.75-15.0							.012-.015	50		.055-.060	.020-.025	13-14	0-3.0
5567	P	Vibrating volt & cur.	1295	-	-	-	.012-.015		8.3 - 8.5							.012-.015	40		.055-.060	.020-.025	6.5 - 7.0	0-3.0
5568	P	Vibrating volt & cur.	1299	-	-	.018-.020	.005-.008		14.75-15.0							.012-.015	100		.050	.020-.025	13-14	0-3.0
5569	P	Vibrating volt & cur.	1402	-	-	-	.012-.015		14.75-15.0							.012-.015	80		.055-.060	.020-.025	13-14	0-3.0
5570	P	Vibrating voltage	1403				.012-.015		8.3 - 8.5										.055-.060	.020-.025	6.5 - 7.0	0-3.0
5571	P	Vibrating volt & cur.	1407	-	-		.012-.015		14.75-15.0							.012-.015	57		.055-.060	.020-.025	13-14	0-3.0
5572	-	Vibrating volt & cur.	1428	-	-		.012-.015		39.5 -40.0							.012-.015	25		.055-.060	.020-.025	34.0 -35.0	0-3.0
5573	N	Voltage	324	-	-		.012-.015		14.75-15.0										.055-.060	.020-.025	13-14	0-3.0

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B — Generator delivers 19-22 amp. with 11 amp. lamp load.

C — Generator delivers 11-13 amp. with 7 amp. lamp load.

D — Generator delivers 10-12 amp. with 7 amp. lamp load.

E — Operate Generator at 2800 to 3000 R.P.M. Connect voltmeter between terminal marked "Ign" and ground.

F — Operate Generator at 2800 to 3400 R.P.M. Connect voltmeter between terminal marked "Ign" and ground.

G — While making voltage regulator tests short circuit Current Regulator with "jumper" across contact points. Connect voltmeter between terminal marked "Ign" and ground.

H — Connect voltmeter between terminal marked "Gen" and ground.

DELCO-REMY CONTROL UNITS' SPECIFICATIONS.—(Continued)*Data revised June 1, 1937 to conform with Delco-Remy Specifications (1R-185, date of 5-29-37).*

				VOLTAGE CONTROL UNIT								CURRENT CONTROL UNIT					CUT-OUT RELAY					
REGULATOR NUMBER	BAT. TERMINAL GROUNDED	TYPE OF UNIT	DELCO-REMY TEST NUMBER	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	ARMATURE TRAVEL (INCHES)	OPEN CIRCUIT VOLTAGE	VOLTAGE SETTING 70° F. WITH GENERATOR CHARGING FROM 8 TO 10 AMPS	POINTS OPEN 70° F. (VOLTS)	POINTS CLOSE 70° F. (VOLTS)	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	SETTING 70° F. (AMPS.)	AIR GAP (INCHES)	POINT OPENING (INCHES)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS.)	
5574	N	Vibrating volt & cur.	326				.012-.015		14.75-15.0								.012-.015	40	.055-.060	.020-.025	13-14	0-3.0
5575	N	Vibrating volt & cur.	1412				.012-.015		14.75-15.0								.012-.015	33	.055-.060	.020-.025	13-14	0-3.0
5576	P	Vibrating volt & cur.	1415				.012-.015		14.75-15.0								.012-.015	33	.055-.060	.020-.025	13-14	0-3.0
5577	P	Vibrating volt & cur.	1417				.012-.015		8.5 - 9.0								.012-.015	50	.055-.060	.020-.025	6.5 - 7.0	0-3.0
5578	P	Vibrating volt & cur.	326				.012-.015		14.75-15.0								.012-.015	40	.055-.060	.020-.025	13.0 -14.0	0-3.0
5579	P	Vibrating v lt & cur.	1426				.012-.015		14.75-15.0								.012-.015	55	.055-.060	.020-.025	13.0 -14.0	0-3.0
5580	P	Vibrating volt & cur.	1299			.018-.020	.005-.008		14.75-15.0								.012-.015	100	.050	.020-.025	13.0 -14.0	0-3.0
5581		Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0
5582		Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0
5583		Two Step voltage	1296	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.0
5584		Two Step voltage	1296	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.0
5585		Tw Step voltage	1297	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0
5586		Two Step voltage	1289	.7- .9		.028-.040	.008-.013	.028-.040			15.5 -16.25	14-15							.012-.017	.015-.025	13.2 -14.0	0-3.5
5587	N	Vibrating volt & cur	1401	3.5	.008-.013	.050-.060	.015-.025		Set on closed cir- cuit only	7.05-7.35			3.5	.008-.013	A .070-.080	.015-.025	20-22		.018-.022	.018-.025	6.5 - 7.0	0-3.0
5588	N	Vibrating voltage	1294	2.7-3.5	.008-.013	.060-.070	.015-.025		Set on closed cir- cuit only	7.55-7.85									.018-.022	.018-.025	H 6.5 - 7.0	0-3.0

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DELCO-REMY CONTROL UNITS' SPECIFICATIONS.

Data revised June 1 1937 to conform with Delco-Remy Specifications (1R-185, date of 5-20-37).

				VOLTAGE CONTROL UNIT								CURRENT CONTROL UNIT					CUT-OUT RELAY					
REGULATOR NUMBER	BAT. TERMINAL GROUNDED	TYPE OF UNIT	DELCO-REMY TEST NUMBER	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	ARMATURE TRAVEL (INCHES)	OPEN CIRCUIT VOLTAGE	VOLTAGE SETTING 70° F. WITH GENERATOR CHARGING FROM 8 TO 10 AMPS	POINTS OPEN 70° F (VOLTS)	POINTS CLOSE 70° F (VOLTS)	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	SETTING 70° F (AMPS.)	AIR GAP (INCHES)	POINT OPENING (INCHES)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS.)	
5589		Two Step voltage	1405	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.5
5590		Two Step voltage	1296	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.0
5591	P	Vibrating voltage	1294	2.7-3.5	.008-.013	.060-.070 A	.015-.025		Set on closed cir- cuit only	E 7.55-7.85									.018-.022	.018-.025	6.5 - 7.0 H	0-3.0
5592	N	Vibrating voltage	1294	2.7-3.5	.008-.013	.060-.070 A	.015-.025		Set on closed cir- cuit only	E 7.55-7.85									.018-.022	.018-.025	6.5 - 7.0 H	0-3.0
5593		Two Step voltage	1296	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.0
5594		Two Step voltage	1405	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.5
5595		Two Step voltage	1405	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.5
5596	P	Vibrating volt & cur.	1411	3.5	.008-.013	.060-.070 A	.015-.025		Set on closed cir- cuit only	7.3-7.6			3.5	.008-.013	.070-.080 A	.015-.025	20-22		.018-.022	.018-.025	6.5 - 7.0 H	0-3.0
5597	P	Vibrating volt & cur.	1293	3.5	.008-.013	.060-.070 A	.015-.025		Set on closed cir- cuit only	7.3-7.6			3.5	.008-.013	.070-.080 A	.015-.025	26-28		.018-.022	.018-.025	6.5 - 7.0 H	0-3.0
5598	P	Vibrating volt & cur.	1404	3.5	.008-.013	.060-.070 A	.015-.025		Set on closed cir- cuit only	14.3-14.9			3.5	.008-.013	.070-.080 A	.015-.025	15-17		.018-.022	.018-.025	13-14	0-3.0
5599	N	Vibrating volt & cur.	1293	3.5	.008-.013	.060-.070 A	.015-.025		Set on closed cir- cuit only	7.3-7.6			3.5	.008-.013	.070-.080 A	.015-.025	26-28		.018-.022	.018-.025	6.5 - 7.0 H	0-3.0
5600	P	Vibrating voltage	1406	2.7-3.5	.008-.013	.060-.070 A	.015-.025		Set on closed cir- cuit only	7.3- 7.6									.018-.022	.018-.025	6.5 - 7.0	0-3.0
5604	P	Vibrating volt & cur.	1434			.012-.015			14.75-15.0							.012-.015	40		.055-.060	.020-.025	13.0 -14.0	0-3.0
5800		Two Step voltage	1408	.7-1.4		.030-.050 A	.008-.020	.030-.050			7.7 - 8.0	6.7-7.1							.012-.017	.015-.025	6.4 - 6.8	0-3.0
5801	N	Vibrating volt & cur.	1404	3.5	.008-.013	.060-.070 A	.015-.025		Set on closed cir- cuit only	14.3-14.9			3.5	.008-.013	.070-.080 A	.015-.025	15-17		.018-.022	.018-.025	1-14	0-3.0

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DELCO-REMY CONTROL UNITS' SPECIFICATIONS.

Data revised June 1, 1937 to conform with Delco-Remy Specifications (1R-185, date of 5-20-37).

				VOLTAGE CONTROL UNIT									CURRENT CONTROL UNIT					CUT-OUT RELAY				
REGULATOR NUMBER	BAT. TERMINAL GROUNDED	TYPE OF UNIT	DELCO-REMY TEST NUMBER	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	ARMATURE TRAVEL (INCHES)	OPEN CIRCUIT VOLTAGE	VOLTAGE SETTING 70° F. WITH GENERATOR CHARGING FROM 8 TO 10 AMPS	POINTS OPEN 70° F. (VOLTS)	POINTS CLOSE 70° F (VOLTS)	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	SETTING 70° F (AMPS)	AIR GAP (INCHES)	POINT OPENING (INCHES)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS.)	
5802	P	Vibrating voltage	1409	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir- cuit only	14.3-14.9									.018-.022	.018-.025	13-14	0-3.0
5803	P	Vibrating voltage	1406	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir- cuit only	7.3- 7.6									.018-.022	.018-.025	6.5 - 7.0	0-3.0
5804	--	Two Step voltage	1410	.7- .9		.028-.040	.008-.013	.028-.040			8.15- 8.5	7.2-7.5							.018-.022	.015-.025	6.4 - 6.8	0-3.5
5805	--	Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0
5806	P	Vibrating volt & cur.	1420	3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir- cuit only	14.3-14.9			3.5	.008-.013	A .070-.080	.015-.025	15-17		.018-.022	.018-.025	12.5 -13.5	0-3.0
5807	N	Vibrating voltage	1294	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir cuit only	E 7.55-7.85									.018-.022	.018-.025	H 6.5 - 7.0	0-3.0
5808	N	Vibrating voltage	1294	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir cuit only	E 7.55-7.85									.018-.022	.018-.025	H 6.5 - 7.0	0-3.0
5809	N	Vibrating volt & cur.	1416	3.5	.008-.013	A .060-.070	.015-.025	--	Set on closed cir- cuit only	7.3- 7.6			3.5	.008-.013	A .070-.080	.015-.025	24-26		.018-.022	.018-.025	6.5 - 7.0	0-3.0
5810	P	Vibrating volt & cur.	1416	3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir- cuit only	7.3- 7.6			3.5	.008-.013	A .070-.080	.015-.025	24-26		.018-.022	.018-.025	6.5 - 7.0	0-3.0
5811	P	Vibrating volt & cur.	1418	3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir cuit only	F, G 7.55-7.85			3.5	.008-.013	A .070-.080	.015-.025	28-30		.018-.022	.018-.025	H 6.5 - 7.0	0-3.0
5812	P	Vibrating voltage	1294	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir cuit only	E 7.55-7.85									.018-.022	.018-.025	H 6.5 - 7.0	0-3.0
5813	P	Vibrating volt & cur.	1419	3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir cuit only	F, G 7.55-7.85			3.5	.008-.013	A .070-.080	.015-.025	24-26		.018-.022	.018-.025	H 6.5 - 7.0	0-3.0
5814	N	Vibrating voltage	1294	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir cuit only	E 7.55-7.85									.018-.022	.018-.025	H 6.5 - 7.0	0-3.0
5815	N	Vibrating voltage	1423	2.8-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir cuit only	7.0 -7.4									.018-.022	.018-.025	6.5 - 7.0	0-3.0
5816		Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0

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REGULATOR NUMBER	BAT. TERMINAL GROUNDED	TYPE OF UNIT	DELCO-REMY TEST NUMBER	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	ARMATURE TRAVEL (INCHES)	OPEN CIRCUIT VOLTAGE	VOLTAGE SETTING 70° F. WITH GENERATOR CHARGING FROM 8 TO 10 AMPS	POINTS OPEN 70° F (VOLTS)	POINTS CLOSE 70° F (VOLTS)	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	SETTING 70° F (AMPS)	AIR GAP (INCHES)	POINT OPENING (INCHES)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS.)	
5817	P	Vibrating voltage	1294	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir cuit only	E 7.55-7.85									.018-.022	.018-.025	H 6.5 - 7.0	0-3.0
5818	P	Vibrating volt & cur.	1419	3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir cuit only	F, G 7.55-7.85			3.5	.008-.013	A .070-.080	.015-.025	24-26		.018-.022	.018-.025	H 6.5 - 7.0	0-3.0
5819	N	Vibrating volt & cur.	1422	3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir cuit only	7.3 -7.6			3.5	.008-.013	A .070-.080	.015-.025	26-28		.018-.022	.018-.025	6.4 - 6.8	0-3.0
5820	P	Vibrating voltage	1406	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir cuit only	7.3 -7.6									.018-.022	.018-.025	6.5 - 7.0	0-3.0
5821		Two Step voltage	1424	.5-1.0		.030-.050	.008-.020	.030-.050			7.7 - 8.0	6.7-7.1							.018-.022	.018-.025	6.4 - 6.8	0-3.0
5822	N	Vibrating voltage	1406	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir cuit only	7.3 -7.6									.018-.022	.018-.025	6.5 - 7.0	0-3.0
5823	N	Vibrating volt & cur.	1420	3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir cuit only	14.3-14.9			3.5	.008-.013	A .070-.080	.015-.025	15-17		.018-.022	.018-.025	12.5 -13.5	0-3.0
5824		Two Step Voltage	1289	.7- .9		.028-.040	.008-.013	.028-.040			15.5 -16.25	14-15							.012-.017	.015-.025	13.2 -14.0	0-3.5
5825	P	Vibrating volt & cur.	1427	3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir cuit only	14.3-14.9			3.5	.008-.013	A .070-.080	.015-.025	12-13		.018-.022	.018-.025	13.0 -14.0	0-3.0
5826	P	Vibrating volt & cur.	1429	3.5	.010	.063	.015-.025		Set on closed cir cuit only	14.3-14.9			3.5	.010	A .070-.080	.015-.025	20		.018-.022	.018-.025	12.5 -13.5	0-3.0
5827	P	Vibrating Voltage	1294	2.7-3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir cuit only	E 7.55-7.85									.018-.022	.018-.025	H 6.5 - 7.0	0-3.0
5828	P	Vibrating volt & cur.	1422	3.5	.010	.063	.015-.025		Set on closed cir cuit only	7.3- 7.6			3.5	.010	A .070-.080	.015-.025	26-28		.018-.022	.018-.025	6.4 - 6.8	0-3.0
5829	P	Vibrating volt & cur.	1430	3.5	.010	.063	.015-.025		Set on closed cir cuit only	14.3-14.9			3.5	.010	A .070-.080	.015-.025	8		.018-.022	.018-.025	12.5 -13.5	0-3.0
5830		Two Step voltage	1296	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.018-.022	.018-.025	6.4 - 6.8	0-3.0
5831	P	Vibrating volt & cur.	1432	3.5	.010	.063	.015-.025		Set on closed cir cuit only	F, G 7.55 7.85			3.5	.010	A .070 .080	.015 .025	26 28		.018 .022	.018-.025	H 6.5 - 7.0	0-3.0

IMPORTANT! Refer to footnote found on the last page of this section for data on a new series of thickness gauge limits adopted by the United Motors Service for making regulator adjustments. Voltage readings should always be taken with cover in place on the control unit. After making adjustments, decrease engine speed until cut-out relay points open; then gradually increase engine speed until points again close, before taking final voltage readings.

A — Measure air gap with armature pressed down until fiber bumper just touches stop.

B — Generator delivers 19-22 amp. with 11 amp. lamp load.

C — Generator delivers 11-13 amp with 7 amp. lamp load.

D — Generator delivers 10-12 amp. with 7 amp. lamp load.

E — Operate Generator at 2800 to 3000 R.P.M. Connect voltmeter between terminal marked "Ign" and ground.

F — Operate Generator at 2800 to 3400 R.P.M. Connect voltmeter between terminal marked "Ign" and ground.

G — While making voltage regulator tests short circuit Current Regulator with "jumper" across contact points. Connect voltmeter between terminal marked "Ign" and ground.

H — Connect voltmeter between terminal marked "Gen" and ground.

DELCO-REMY CONTROL UNITS' SPECIFICATIONS.—(Continued)

Data revised June 1, 1937 to conform with Delco-Remy Specifications (1R-185, date of 5-20-37).

				VOLTAGE CONTROL UNIT									CURRENT CONTROL UNIT					CUT-OUT RELAY				
REGULATOR NUMBER	BAT. TERMINAL GROUNDED	TYPE OF UNIT	DELCO-REMY TEST NUMBER	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	ARMATURE TRAVEL (INCHES)	OPEN CIRCUIT VOLTAGE	VOLTAGE SETTING 70° F. WITH GENERATOR CHARGING FROM 8 TO 10 AMPS	POINTS OPEN 70° F. (VOLTS)	POINTS CLOSE 70° F. (VOLTS)	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	SETTING 70° F. (AMPS.)	AIR GAP (INCHES)	POINT OPENING (INCHES)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS.)	
5832	N	Vibrating volt & cur.	1432	3.5	.010	A .063	.015-.025		Set on closed cir cuit only	F, G 7.55-7.85			3.5	.010	A .070-.080	.015-.025	26-28		.018-.022	.018-.025	H 6.5 - 7.0	0-3.0
5833		Two Step voltage	1433	.7- .9		.028-.040	.008-.013	.028-.040			7.5 - 7.8	7.0-7.3							.018-.022	.018-.025	6.4 - 6.8	0-3.0
5834		Two Step voltage	1289	.7- .9		.028-.040	.008-.013	.028-.040			15.5 -16.25	14-15							.012-.017	.015-.025	13.2 -14.0	0-3.5
SM 1428	P	Vibrating volt & cur.	1288				.012-.015		29.5 -30.0							.012-.015	14		.055-.060	.020-.025	26.0 -27.0	0-3.0
SM 1527		Vibrating volt & cur.	1288				.012-.015		29.5 -30.0							.012-.015	14		.055-.060	.020-.025	26.0 -27.0	0-3.0
SM 1553	P	Vibrating volt & cur.	1290				.012-.015		29.5 -30.0								.012-.015	25	.055-.060	.020-.025	26.0 -27.0	0-3.0
SM 1559		Vibrating volt & cur.	1291				.012-.015		36.5 -37.0								.012-.015	14	.055-.060	.020-.025	34.0 -35.0	0-3.0
SM 1719		Two Step voltage	1289	.7- .9		.028-.040	.008-.013	.028-.040			15.5 -16.25	14-15							.012-.017	.015-.025	13.2 -14.0	0-3.5
SM 1739		Two Step voltage	1242	.7- .9		.028-.040	.008-.013	.028-.040			8.35- 8.65	7.3-7.7							.012-.017	.015-.025	6.4 - 6.8	0-3.0
SM 1780	P	Vibrating volt & cur.	1404	3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir cuit only	14.3-14.9			3.5	.008-.013	A .070-.080	.015-.025	15-17		.018-.022	.018-.025	13.0 -14.0	0-3.0

IMPORTANT! Refer to footnote found on the last page of this section for data on a new series of thickness gauge limits adopted by the United Motors Service for making regulator adjustments. Voltage readings should always be taken with cover in place on the control unit. After making adjustments, decrease engine speed until cut-out relay points open; then gradually increase engine speed until points again close, before taking final voltage readings.

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E — Operate Generator at 2800 to 3000 R.P.M. Connect voltmeter between terminal marked "Ign" and ground.

F — Operate Generator at 2800 to 3400 R.P.M. Connect voltmeter between terminal marked "Ign" and ground.

G — While making voltage regulator tests short circuit Current Regulator with "jumper" across contact points. Connect voltmeter between terminal marked "Ign" and ground.

H — Connect voltmeter between terminal marked "Gen" and ground.

DELCO-REMY CONTROL UNITS' SPECIFICATIONS.—(Continued)

Data revised June 1, 1937 to conform with Delco-Remy Specifications (1R-185, date of 5-20-37).

REGULATOR NUMBER	BAT. TERMINAL GROUNDED	TYPE OF UNIT	DELCO-REMY TEST NUMBER	VOLTAGE CONTROL UNIT							CURRENT CONTROL UNIT				CUT-OUT RELAY						
				CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	ARMATURE TRAVEL (INCHES)	OPEN CIRCUIT VOLTAGE	VOLTAGE SETTING 70° F. WITH GENERATOR CHARGING FROM 8 TO 10 AMPS.	POINTS OPEN 70° F. (VOLTS)	POINTS CLOSE 70° F. (VOLTS)	CONTACT SPRING TENSION (MINIMUM OUNCES)	GAP BETWEEN FIBER BUMPER AND CONTACT SPRING STOP (INCHES)	AIR GAP (INCHES) Armature Down	CONTACT OPENING (INCHES)	SETTING 70° F. (AMPS.)	AIR GAP (INCHES)	POINT OPENING (INCHES)	POINTS CLOSE (VOLTS)	POINTS OPEN (AMPS.)
SM 1804	P	Vibrating voltage	324				.012-.015		14.75-15.0									.055-.060	.020-.025	13.0 -14.0	0-3.0
SM 1846		Vibrating volt & cur.	1413				.012-.015		36.5 -37.0									.055-.060	.020-.025	34.0 -35.0	0-3.0
SM 1875		Vibrating volt & cur.	1414				.012-.015		36.5 -37.0									.055-.060	.020-.025	34.0 -35.0	0-3.0
SM 1891	N	Vibrating volt & cur.	1421	3.5	.008-.013	A .060-.070	.015-.025		Set on closed cir- cuit only	F, G 7.55-7.85			3.5	.008-.013	A .070-.080	.015-.025	12-14	.055-.060	.020-.025	H 6.5 - 7.0	0-3.0
SM 1957		P	Vibrating volt & cur.	1431	3.5	.010	A .063	.015-.025		Set on closed cir- cuit only	14.3-14.9			3.5	.010	A .070-.080	.015-.025	9-11	.018-.022	.018-.025	12.5 -13.5	0-3.0

IMPORTANT! Refer to footnote found on the last page of this section for data on a new series of thickness gauge limits adopted by the United Motors Service for making regulator adjustments. Voltage readings should always be taken with cover in place on the control unit. After making adjustments, decrease engine speed until cut-out relay points open; then gradually increase engine speed until points again close, before taking final voltage readings.

- A — Measure air gap with armature pressed down until fiber bumper just touches stop.
B — Generator delivers 19-22 amp. with 11 amp. lamp load.
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G — While making voltage regulator tests short circuit Current Regulator with "jumper" across contact points. Connect voltmeter between terminal marked "Ign" and ground.
H — Connect voltmeter between terminal marked "Gen" and ground.

To simplify the work of making mechanical adjustments on Delco-Remy control units, a new assortment of thickness gauges, both Flat and Wire, as well as a new series of gauge limits, have been adopted by the United Motors Service. Sizes of the new gauges are as follows:

Flat Stock	Wire Gaug
.008 inch	.035 inch
.010 inch	.045 inch
.015 inch	.063 inch
.020 inch	.075 inch

Delco-Remy specifications were formerly tabulated with a minimum and a maximum limit. Starting in 1937 they are shown as follows:

.008 inch (formerly .006-.008)
.010 " " .008-.013
.057 " " .055-.060
.020 " " .020-.025
.015 " " .012-.017
.063 " " .060-.070

4. Inspect both the flexible terminal connector wire and the flexible ground lead for signs of broken strands (see Fig. 12). Our engineers recommend that these two wires be replaced with new, genuine Delco-Remy (or Auto-Lite if an Auto-Lite unit) wires, each time a distributor is overhauled.

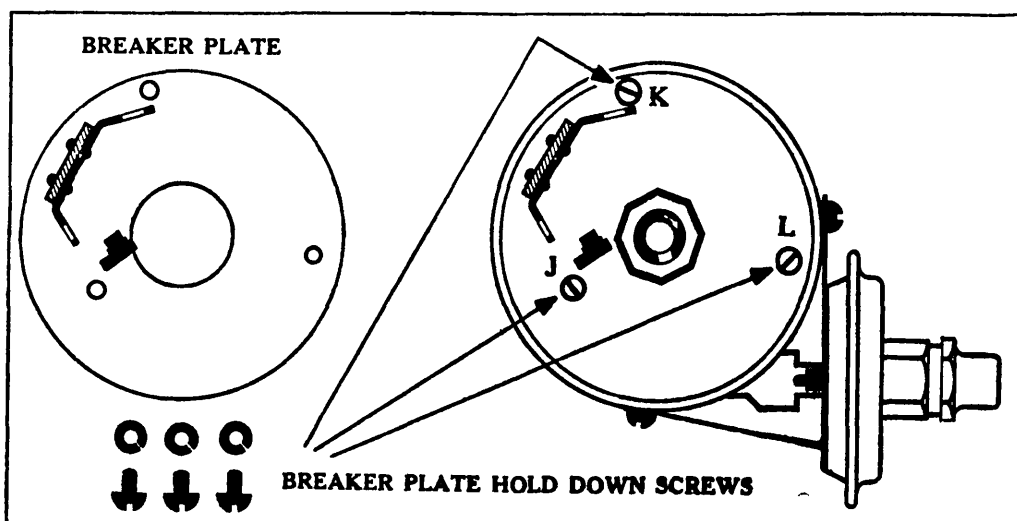


Fig. 7

Remove remaining screws from Breaker Plate, and lift out the Plate.

size drawings of all Auto-Lite flexible leads are shown by Fig. 25.

Be sure to read the special information on the improved 1937 Auto-Lite Flexible Leads found at the end of this article.

IMPORTANT: Check your leads against the drawings (lay the wire right on the drawing). You will notice that two leads may be the same in length but that there is a difference in the way the terminals are attached. Use the correct leads for the distributor on which you are working.

TO ASSEMBLE.

1. Replace vacuum control unit.
2. Refer to Fig. 14. Drop ball bearing retainer plate into distributor cup, making sure that slot "X" is directly over hole "Y" in vacuum control unit lever, and that the three ears "U", "V" and "W" on the breaker plate, come to rest on the projecting shelf "AA" in bottom of distributor cup.

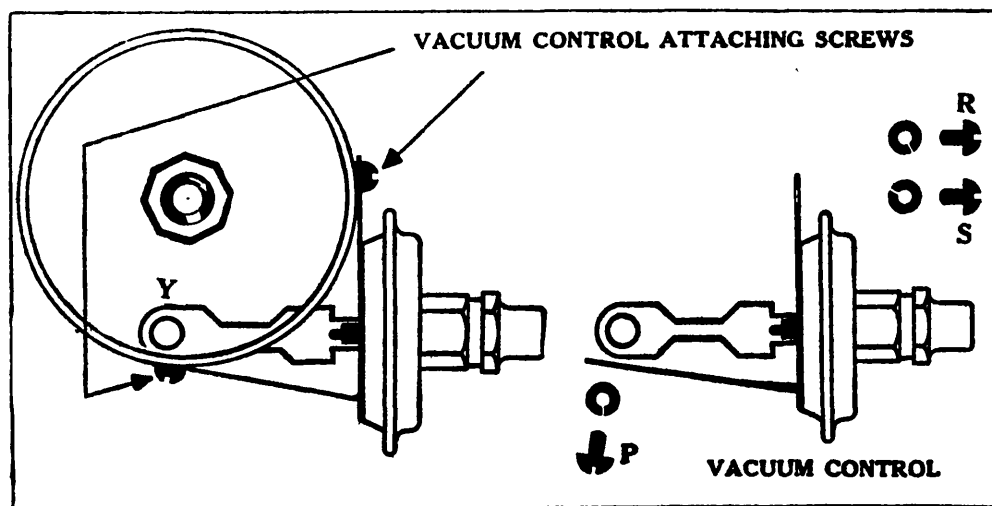


Fig. 9

Remove Vacuum Control Attaching Screws and detach Unit from side of Distributor Cup.

WARNING: Do not be tempted to invent make-shift leads out of brush pig tails or electric light fixture wire. To do so is to "court disaster". Bear in mind that the breaker plate in these distributors is constantly in motion, and the leads are constantly being twisted. Unless a special annealed wire is used the strands will soon crystallize and break.

Fig. 13 shows life size drawings of all the flexible leads used up to the present time (July 1937), by Delco-Remy. The 1865978 lead is a new development, and is the only lead now used on either the six or eight cylinder new series, 1937 Delco-Remy distributors. Use of the flexible ground lead has been discontinued. Life

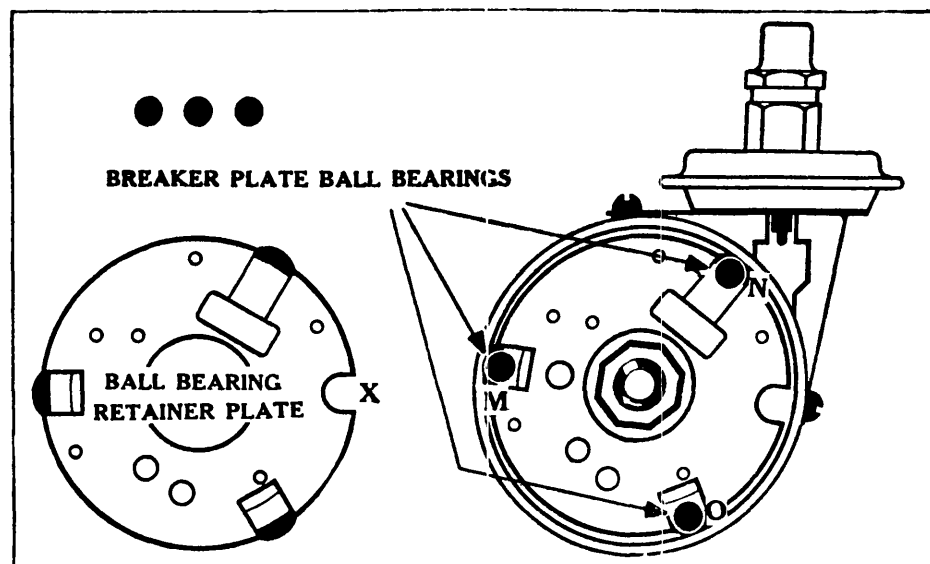


Fig. 8

Remove the three Steel Balls and lift out the Ball Bearing Retainer Plate.

3. Smear the three steel balls with vaseline, and drop them into place (see Fig. 8).

4. Hold the breaker plate by the breaker arm pivot, and carefully return the plate to its place in the distributor cup, making sure that the pin on bottom of the breaker plate drops thru the slot in the ball bearing retainer plate, and into the hole in end of vacuum control lever.

IMPORTANT: Because of the spring under the breaker plate, the plate will not be flat in the distributor cup when it comes to rest, but will be at a slight angle.

5. The first screw to replace in the breaker plate is the one which goes in the hole close to the stationary breaker point ("BB", Fig. 15). When this screw is tightened the breaker plate will come down into place.

6. Follow with the remaining breaker plate screws and tighten each one securely.

7. With the thumb and forefinger turn the breaker plate to make sure it is not cramped, stuck or binding.

8. Attach flexible ground lead. Refer to Fig. 6 for order in which parts are assembled, and the end of the flexible lead which should be attached to the breaker plate.

9. Assemble the insulated terminal stud. Refer to Fig. 5 for order in which parts should go.

WARNING: Just bring the insulated terminal stud nut up to a snug fit. If undue force is used in tightening this nut the moulded bushing will split and the stud will pull thru and out.

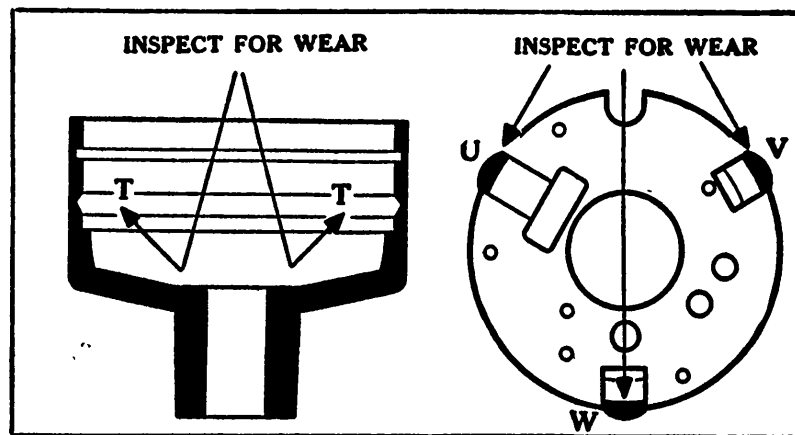


Fig. 10

Inspect Distributor Cup and Retainer Plate for signs of wear.

IMPORTANT: Fig. 16 shows a detail of the inside insulating bushing. From this drawing it will be seen that there is a moulded key ("CC") on the bushing which fits into the groove ("DD") cut in the distributor cup. On the inside face of this bushing there is a dowel pin which fits thru the slot ("EE") in the terminal of the flexible connector wire. This construction makes it impossible for the wire terminal to turn when the nut is tightened, possibly grounding the distributor thru the breaker plate. Note that the terminal is so attached that the wire points "up" when assembled.

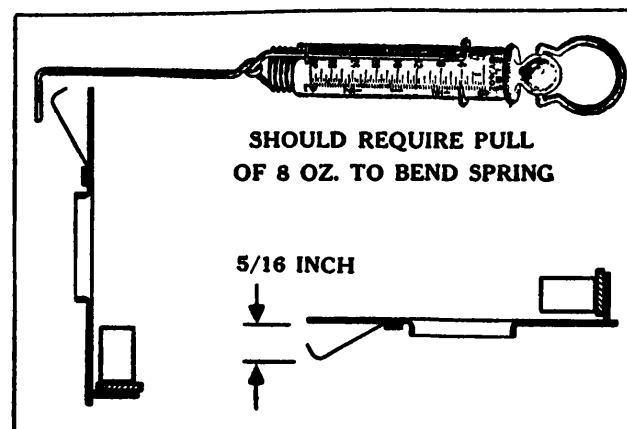


Fig. 11

Inspect Breaker Plate Spring and test for tension.

10. Replace breaker arm and spring; tighten breaker arm spring attaching screw. If this screw was completely removed when the distributor was disassembled refer to Fig. 4 for order in which the parts should be assembled. Fig. 17 shows how the terminal on the flexible wire should fit over the insulated support.

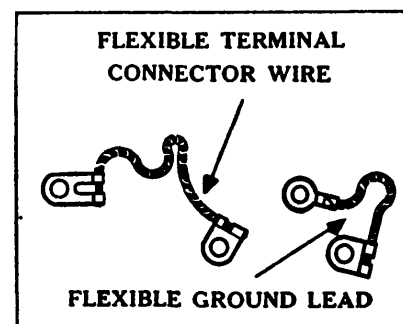


Fig. 12

Inspect Flexible Leads for frayed or broken strands.

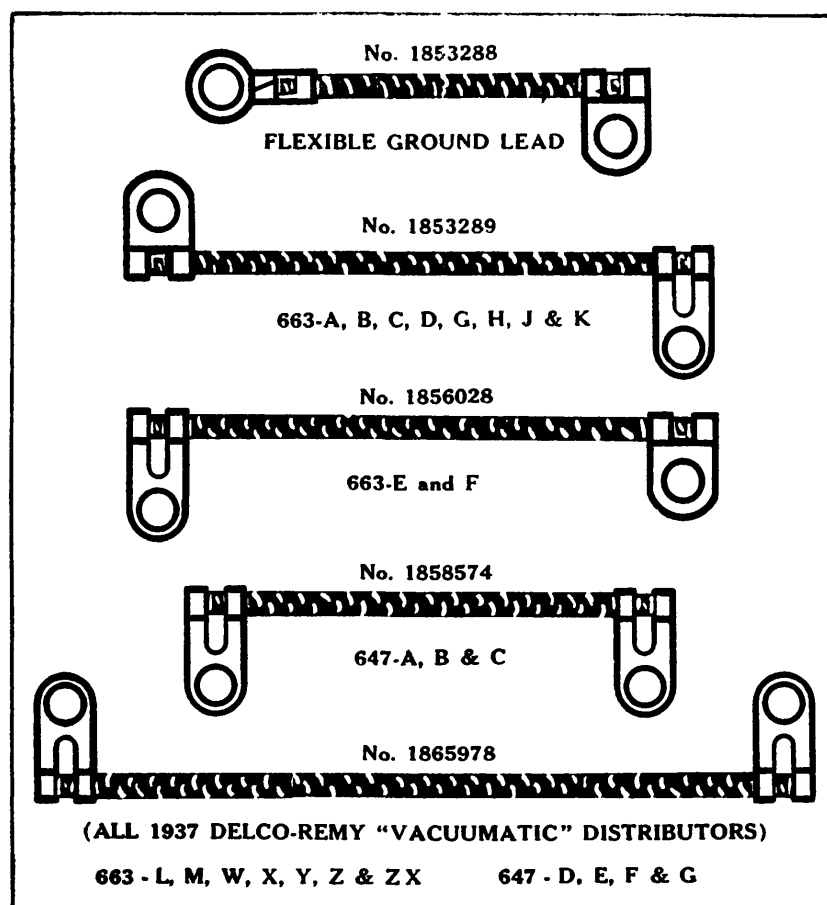


Fig. 13

Life size drawings of all Delco-Remy Flexible Leads used up to the present time (July 1937). To identify a Lead, match your wires with the drawing. Pay particular attention to the Terminals on the Leads, and make sure that they point in the right direction.

11. Tension the breaker arm spring by changing the position of the attaching screw in the elongated slot (proper tension should be between 19 and 23 oz.), and line up the breaker points.

12. Replace condenser.

13. The final and, perhaps most important assembly operation is to carefully adjust the flexible terminal connector wire, forming it around into a position which will permit it to bend as the breaker plate moves but not chafe against the distributor cup. Make sure it is pressed down into place, and does not "ride high" and touch the rotor. When working on the 1937 series of Auto-Lite or Delco-Remy "Vacuumatic" distributors it will be found that provision has been made for taking care of this important detail. On Auto-Lite distributors the flexible lead is clipped to the condenser lead, while Delco-Remy distributors have a split paper support riveted to the breaker plate, and the flexible lead is held securely in place by it.

FINAL DISTRIBUTOR TEST.

1. Set cam angle to correct value.

IMPORTANT NOTE: The Delco-Remy factory specifications call for a cam angle of 31 degrees on all their 8 cylinder vacuumatic distributors. Our engineers recommend a 29 degree cam angle on these distributors, which will result in approximately a .015 or .016 inch contact separation. The 6 cylinder Delco-Remy distributors of this type should be adjusted with a cam angle of 35 degrees. (A 36 degree cam angle was formerly specified for six cylinder distributors; however, Delco-Remy revised specifications, dated 5-20-37, call for a 35 degree angle.) Our engineers now recommend that Auto-Lite, 8 cylinder vacuumatic distributors be adjusted with a cam angle of 28 degrees. This is a compromise between the official Auto-Lite specifications of 27 degrees and the specifications which we issued in 1936 of 29 degrees, which figure was determined by experimentation. In 1937 our engineers still recommend the 40 degree cam angle for the 6 cylinder Auto-Lite vacuumatic distributors, which is the same cam angle as was recommended in 1935 and 1936.

2. Run test on automatic spark advance, checking values against characteristics specified for the particular unit.

IMPORTANT NOTE: Bear in mind that there are two types of automatic distributor advances. First, those which start at a given point, and continue to advance in a straight line until they reach their maximum. These are known as distributors with a "straight line" curve. The second type is known as the "dog-leg" advance. Distributors with a "dog-leg" advance start at a certain point, and advance very rapidly as the distributor shaft speed is increased up to six or seven hundred R.P.M. Figure 1 of this article shows the advance characteristics of a distributor of this type. From then on the curve flattens out, and is a straight line until the peak is reached. Distributors with a dog-leg advance may readily be identified by referring to the distributor advance tables in the Standard Auto-Electrician's Manual. If the word *intermediate* is found in the distributor advance table *that is the point* where the curve changes its slant. If no intermediate is found the distributor has a straight curve.

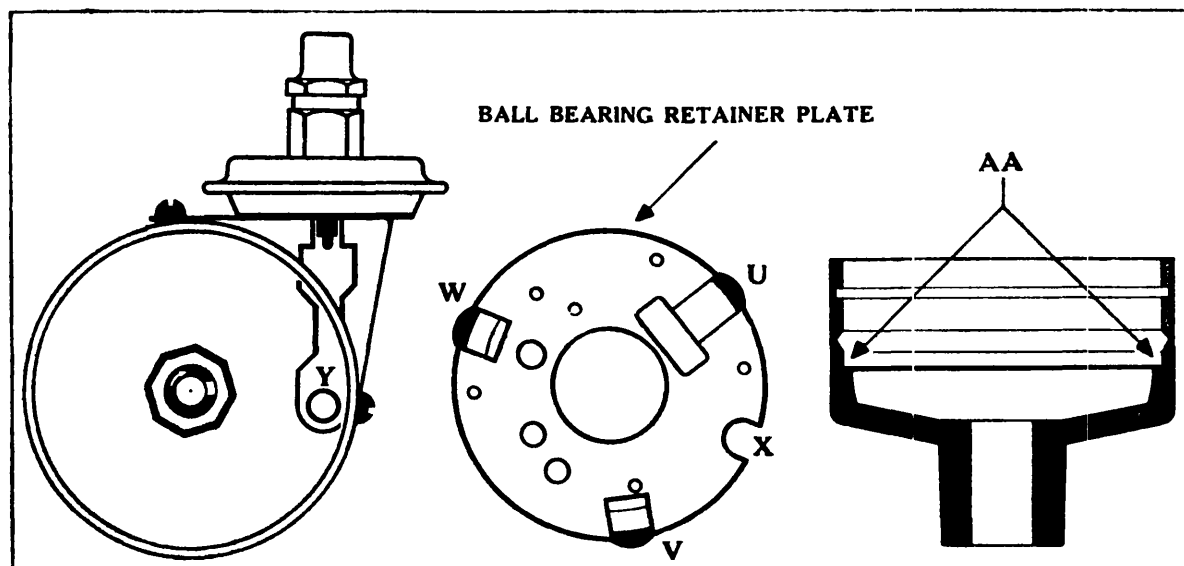


Fig. 14

The Slot "X" in Ball Bearing Retainer Plate should come directly over Hole "Y" in Vacuum Control Unit Lever.

3. Run distributor in an Oscillograph or Syncrograph at a speed below that at which the automatic advance spark starts, or at a speed above that at which the maximum automatic spark advance is reached.

4. Apply a vacuum to the vacuum control unit, and make a record of the degrees of distributor advance, as the vacuum is increased inch by inch, until the maximum advance is reached. Refer to the ignition data in the Standard Manual for the official figures and vacuumatic control characteristics.

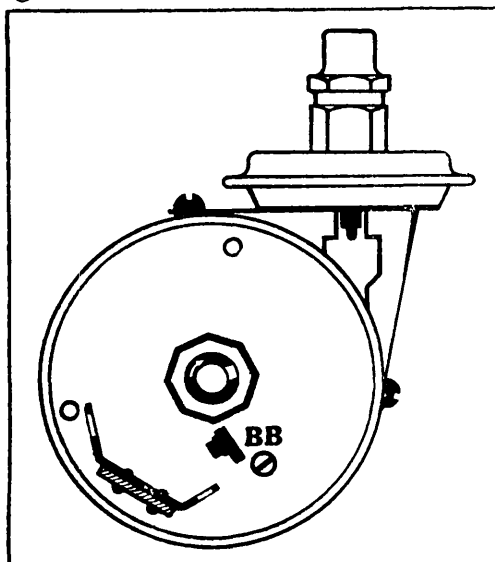


Fig. 15

The Breaker Plate Screw, located close to the Stationary Point, should be assembled first.

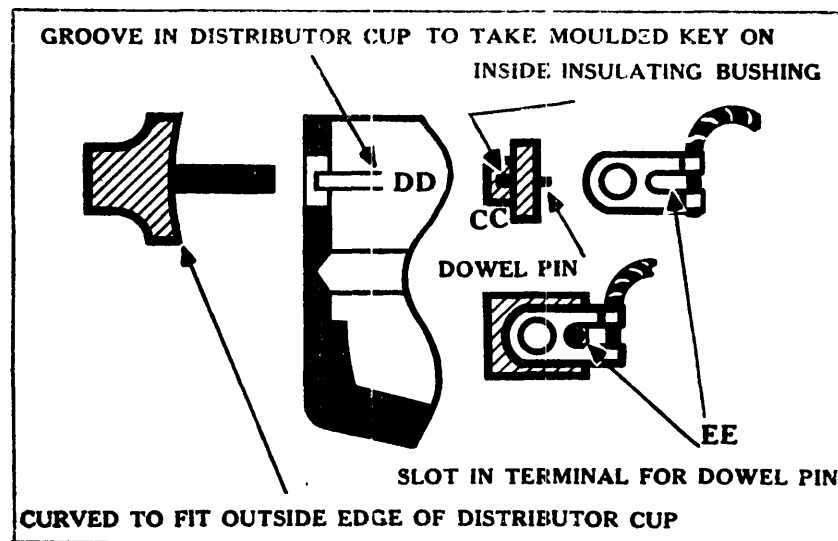


Fig. 16

The moulded Key on the inside Bushing fits into a groove cut in the Distributor Cup, while the moulded Dowel Pin fits thru the Slot in the Lead Terminal.

5. Check the distributor cam angle degree by degree as the vacuum chamber operates.

IMPORTANT: The distributor cam angle should not change more than plus or minus 1 degree throughout the entire vacuum advance range. If an error of more than plus or minus 1 degree is found it is an indication of worn parts, or possibly a weak spring under the breaker plate, or even improper assembly.

WARNING: Do not attempt to check the action or range of the vacuum advance mechanism by moving the breaker plate by hand. If you do not have facilities for creating a variable vacuum of from zero to twenty inches of mercury, when it comes to testing the vacuum unit, take the distributor to a shop that has, or else use the vacuum from the intake manifold of another engine.

PROCEDURE TO FOLLOW WHEN OVERHAULING THE FIRST SERIES SIX CYLINDER, DELCO-REMY "VACUUMATIC" DISTRIBUTORS.

The construction of the six cylinder Delco-Remy "vacuumatic" distributor is somewhat different from that of the eight cylinder units just described, in that the breaker plate and ball bearing retainer plate are riveted together. In order to remove the breaker plate assembly it is first necessary to remove the vacuum control attaching screws ("P", "R" and "S", Fig. 9). With these three screws removed the vacuum control chamber may be pulled in end, which, in turn, will rotate the breaker plate assembly a small amount.

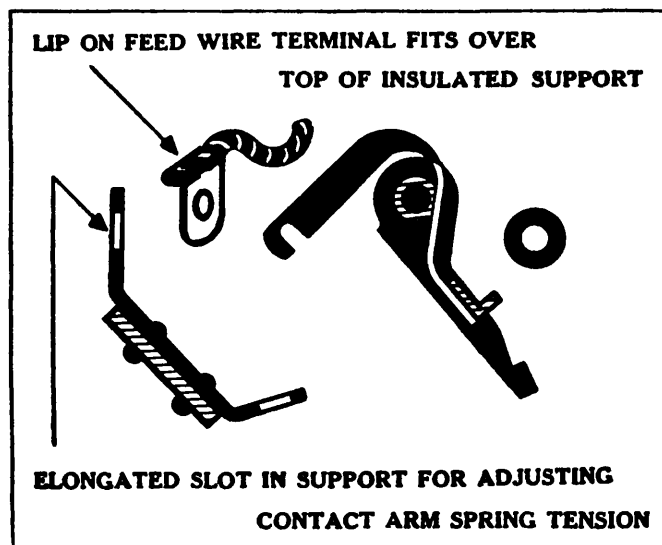


Fig. 17

Detail drawing showing how the Feed Wire Terminal should fit over the Insulated Support.

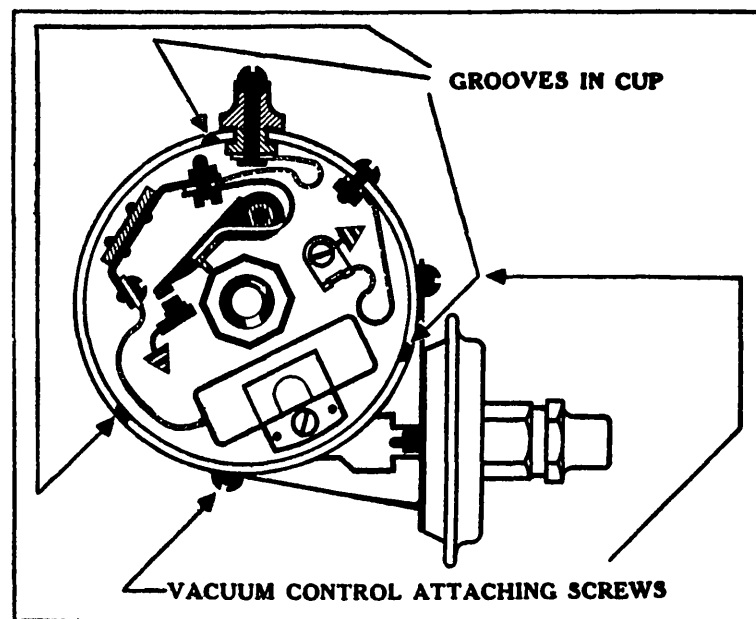


Fig. 18

Top view of Distributor with Cap and Rotor removed. Note the three vertical grooves cut in side of the Distributor Cup.

By inspecting the top of the distributor cup (see Fig. 18) it will be seen that there are three half-round vertical grooves, cut on the inside of the cup, spaced one hundred and twenty degrees apart. With the vacuum chamber loose the breaker plate may be turned sufficiently to permit the three steel balls to line up with the three grooves, at which time the entire breaker plate assembly may be lifted up and out of the distributor.

WARNING: Watch for the three steel balls when the breaker plate is lifted up and out, as there is nothing to keep them in place when the breaker plate is removed from the distributor cup.

When reassembling the unit, fill the ball bearing retaining pockets with light grease or vaseline, in order to stick the balls, while the assembly is being lowered down into place in the distributor cup.

The novel idea of stamping the breaker spring anchor from the breaker plate was first employed on the 1935, 6 cylinder Delco-Remy "Vacuumatic" Distributors. This practice was continued in 1936. In 1937, however, we find the idea still further developed and, while the breaker spring anchor is still a stamping, it now is a part of the stationary or lower contact support, on both the six and eight cylinder new type distributors.

Care should be exercised when changing breaker points or condensers on distributors with this type of construction, to make sure that the small parts are correctly assembled. Figure 19 shows the eleven small parts which are clamped together by the breaker arm spring attaching screw. The parts are shown in the correct order for assembling. Pay particular attention to the fiber insulating bushing which should fit into the "horse-shoe" hole in the breaker spring anchor. This bushing is held securely in place by the two flat insulating plates, assembled one on each side of the anchor. By referring to Figure 19 you will find a full size insert showing how the terminals on the flexible terminal connector wire should be assembled. The rolled lip on the terminal fits into the recess in the flat fiber plate, thus securely holding the terminal in place, and preventing it from turning when the breaker arm attaching screw is tightened.

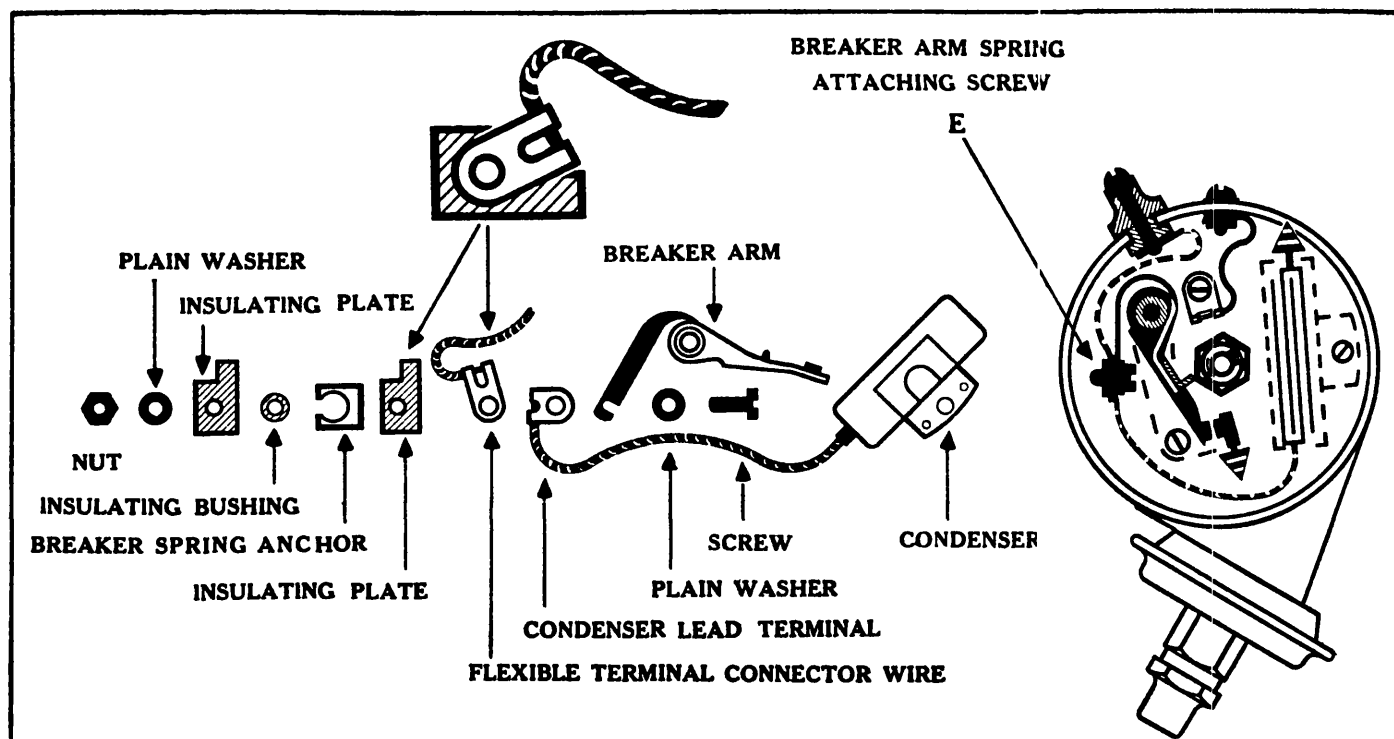


Fig. 19

Detail of the six cylinder Breaker Spring Anchor Assembly.

PROCEDURE TO FOLLOW WHEN CHANGING THE VACUUM CONTROL CHAMBER ON EITHER THE SIX OR EIGHT CYLINDER, EARLY TYPE DELCO-REMY "VACUUMATIC" DISTRIBUTORS.

The vacuum chamber on either the six or eight cylinder, early type distributors, may be changed without disturbing the condenser, breaker points, leads, or other parts of the distributor, by first removing the three vacuum control attaching screws ("P", "R" and "S", Fig. 9) and then rotating the breaker plate sufficiently to allow the three ball bearings to register with the three vertical grooves cut in the distributor cup. The breaker plate may then be lifted just enough to allow the actuating stud on the bottom of the plate to be disengaged from the hole in the vacuum control link ("Y", Fig. 9). The control assembly may then be removed from the distributor cup.

1937 DELCO-REMY VACUUM CONTROLLED DISTRIBUTORS

Standard Equipment on 1937 Buick, Oldsmobile, Packard, Pierce-Arrow and
Pontiac Automobiles.

The 1937 series of Delco-Remy "Vacuumatic" distributors are designed to accomplish the same general purposes as outlined on the first pages of this article; however, refinements have been made, construction costs reduced, and the units improved and simplified. It was not uncommon to find unmistakable signs of looseness and wear in the early type distributors, after operating but twelve to fifteen hundred miles. A recent inspection of new type distributors, which already have ten to fifteen thousand miles to their credit, still showed them to be in excellent condition. Construction of the 1937 series of Delco-Remy "Vacuumatic" Distributors differs quite radically from that used from 1934 to 1936. The improved method of mounting and maintaining a constant pressure on the movable breaker plate has completely eliminated the tendency of vacuum controlled distributors to change their cam angle as the vacuum chamber functions. The change from a "Vee" shaped race, as used in the early type distributor cups to the conventional oval ball race, which is now being used, results in a larger bearing surface for the three steel balls and, consequently, less distributor cup wear. The improved method of attaching the vacuum chamber has greatly simplified the operation of testing and servicing the units.

PROCEDURE TO FOLLOW WHEN OVERHAULING EITHER A SIX OR EIGHT CYLINDER 1937 SERIES, DELCO-REMY "VACUUMATIC" DISTRIBUTOR.

NOTE The same general procedure, as previously outlined, should be followed in removing the distributor from the engine, washing the unit, and clamping it in a suitable fixture. After these operations have been performed, proceed as follows:

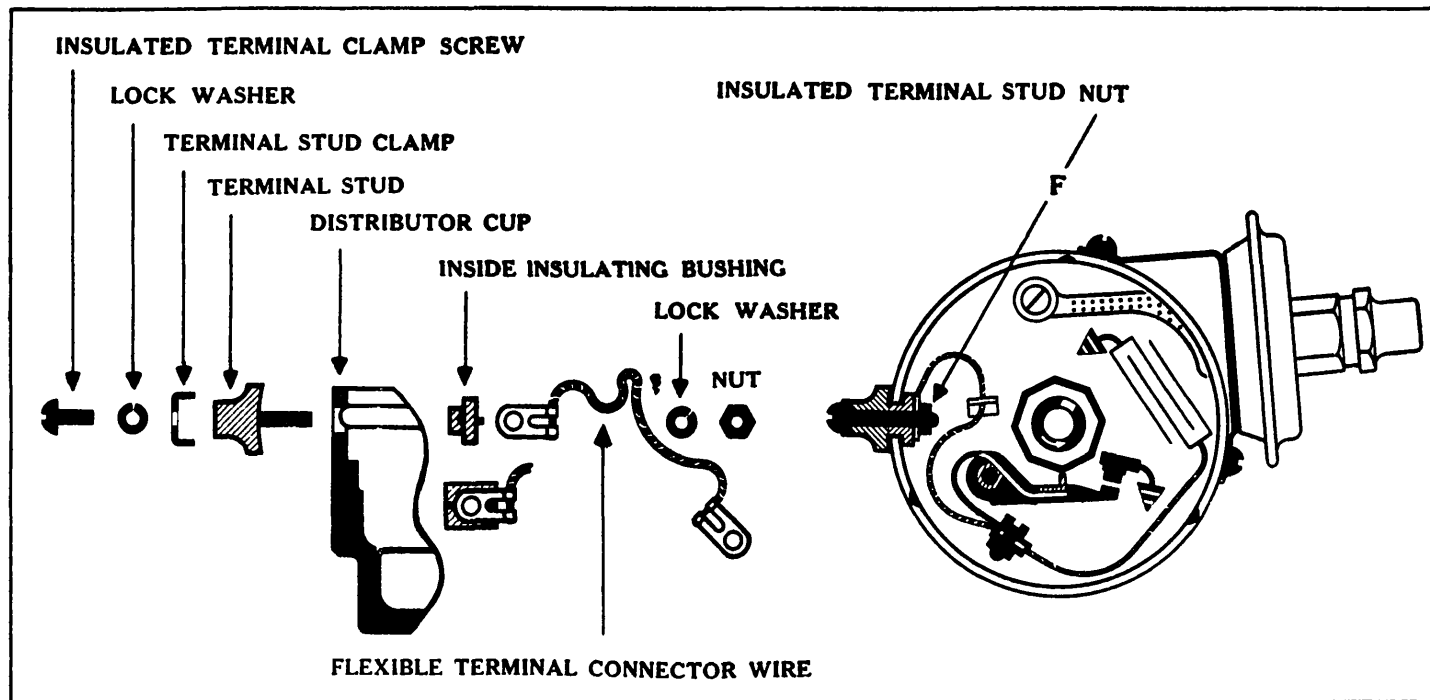


Fig. 20
Remove Insulated Terminal Stud Nut

1 Remove distributor cap and rotor

2 Remove the insulated terminal stud nut ("F", Fig 20), and slip terminal stud out through the side of the distributor cup, then lift out inside insulating bushing and lock washer from distributor cup

3 Remove the vacuum control arm attaching screw ('A', Fig 21), the lock washer 'B', and the breaker plate grounding spring washer "C"

4 Next remove the vacuum chamber from the distributor cup, by first removing vacuum control attaching screw ("R", Fig 22), and then loosening vacuum control clamp screw "S". Attaching screw 'R' is a round head, 10/32 machine screw, 1/4 inch long. Clamp screw 'S' is also a round head, 10/32 machine screw, however, its length is 5/16 of an inch. There is no need of removing the clamp screw from the distributor cup, however, should it be taken out pay particular attention that the longer of the two screws is used for the clamp. The vacuum chamber may now be removed.

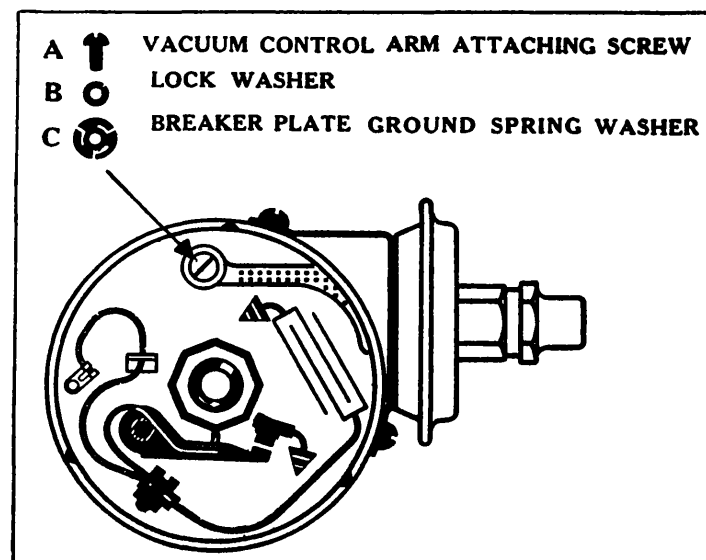


Fig. 21
Remove Vacuum Control Arm Attaching Screw, and lift out the Lock Washer and Breaker Plate Grounding Spring Washer

5 Next remove the breaker plate. By inspecting the top of the distributor cup (Fig 18), it will be seen that there are three half round vertical grooves cut on the inside of the cup, spaced 120 degrees apart. The breaker plate should be *rotated clockwise* a sufficient distance to allow the three steel balls to register with the three vertical grooves cut in the distributor cup. The breaker plate may then be lifted up and out from the distributor cup. **WARNING!** Watch for the three steel balls when the breaker plate is lifted up and out, as there is nothing to keep them in place when the breaker plate is removed from the distributor cup. When reassembling the unit fill the ball bearing retaining pocket with light grease or vaseline in order to stick the balls while the assembly is lowered down into place in the distributor cup.

Figure 23 shows the breaker plate in place in the distributor cup before it has been rotated clockwise, and also shows the plate after it has been removed from the cup. In experimenting with these distributors our engineers find that it is advisable, when removing the breaker plate from the cup, to tilt the assembly and lift out the side with the tension spring first. This relieves the pressure on the plate, and makes it an easy matter to lift the plate from its position in the cup. In assembling we suggest that the same procedure be followed, only in the reverse order.

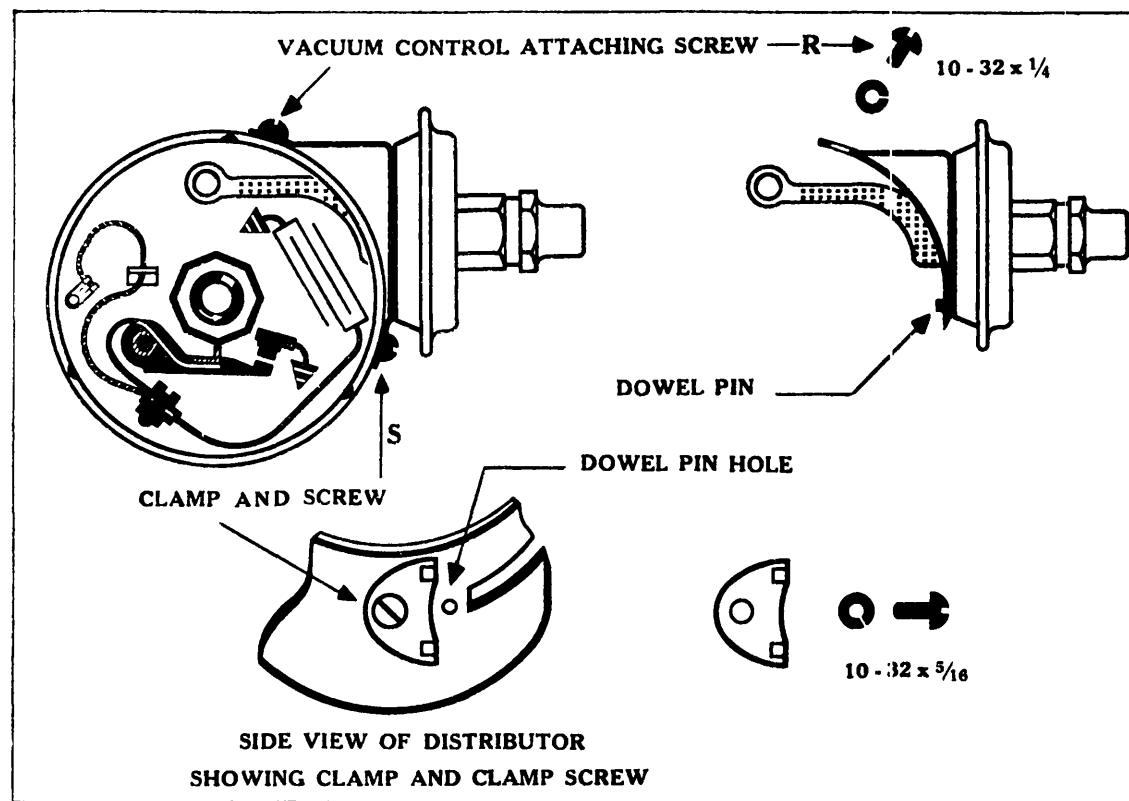


Fig. 22

Remove the $10/32 \times \frac{1}{4}$ inch Vacuum Control Attaching Screw, and loosen the $10/32 \times \frac{5}{16}$ inch Clamp Screw. Unit may then be removed from side of the Distributor Cup.

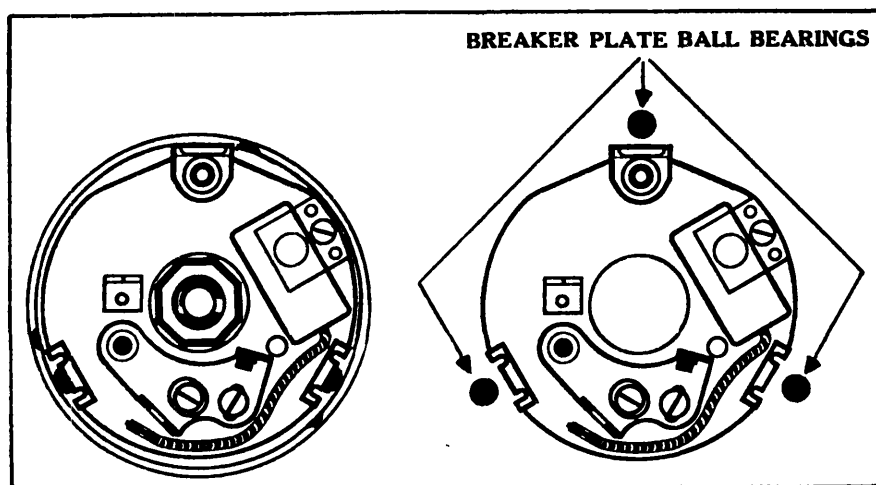


Fig. 23

Rotate Breaker Plate until Steel Balls line up with the grooves cut in Distributor Cup.
Lift the Breaker Plate up and out.

6. Remove the movable breaker arm. The movable breaker arm may be removed from the distributor, either before or after the breaker plate has been lifted from the cup. Our engineers find that it is more convenient to perform this operation after the breaker plate has been removed from the cup. Figure 24 shows the lower contact and breaker spring anchor, together with the various parts which are held together by the breaker spring attaching screw "E". The parts are shown in the proper order for assembling, and special care should be exercised to see that the insulating bushing is placed in the horse-shoe hole in the breaker spring anchor, which is a part of the lower contact support. It will be noticed that the lip on the condenser terminal fits snugly over the insulating plate on the inside of the breaker spring anchor, and that the lip on the terminal of the flexible feed wire fits over the breaker arm spring.

INSPECTION OF PARTS.

NOTE: The same general directions, as specified for the early type distributors should be followed in inspecting the late type units.

Because of the rugged construction of the breaker plate tension spring, no special tests or instructions are necessary. While the breaker plate is still removed from the distributor cup inspect for broken governor weight springs, and for smooth action of the governor mechanism, as explained for the early type distributors. Little or no difficulty will be experienced in reassembling these distributors. Their construction is not complicated, and it is simply a case of reversing the operation followed when taking the dis-

tributor apart. There is one important assembly operation, however, to which the operator should pay particular attention, and that is the attaching of the vacuum control chamber to the side of the distributor cup. By referring to Figure 22 it will be seen that a dowel pin projects from the bottom side of the vacuum chamber, whereas a dowel pin hole is shown on the side view of the distributor cup. The dowel pin should be entered in the dowel pin hole, and the whole assembly held firmly against the distributor cup when vacuum control attaching screw "R" is entered in its hole. If the dowel pin is properly assembled in the hole, and the clamp and screw properly tightened, no trouble will be experienced from loose vacuum control chambers; however, if this assembly operation is improperly conducted the vacuum chamber may be twisted loose from the cup when engine timing is performed. Our engineers have found that practically every tune-up operator will grasp the distributor by the control chamber when changing the distributor timing. A distributor with a loose chamber may readily be detected, as the engine will invariably be "rough" at a speed of from 20 to 25 miles per hour.

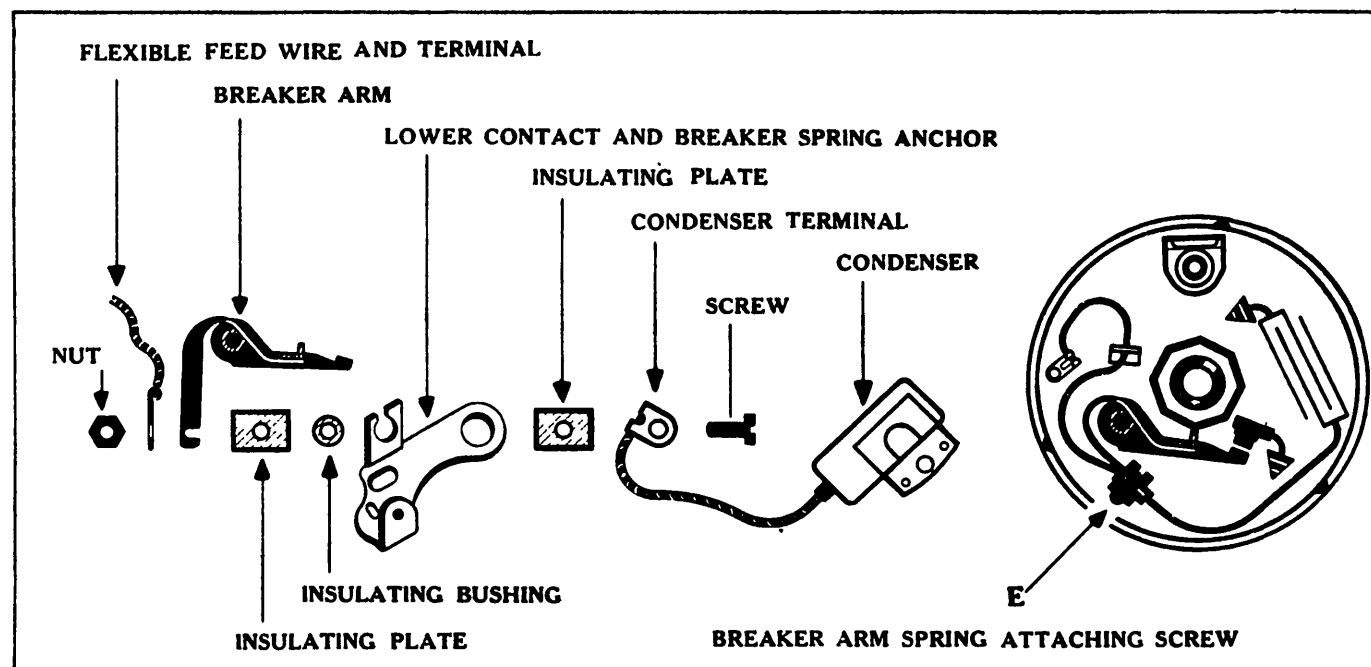


Fig. 24

Loosen Breaker Arm Spring Attaching Screw.

AUTO-LITE DISTRIBUTOR BREAKER PLATE NUMBERS.

Auto-Lite distributors using a vacuum control of the spark have the amount of vacuum advance limited by a hole cut in the breaker plate, into which is fitted a small tongue on the sub-plate. In order that the vacuum advance be held to the correct specifications it is absolutely essential that the correct breaker plate assembly be used. Several of the Auto-Lite breaker plate assemblies are identical except for the size of this hole. Breaker plate assemblies can be identified by the number stamped on the upper side of the plate, this number corresponding to the total vacuum advance (in distributor degrees) for the unit.

When repairing an Auto-Lite distributor of the vacuum control type, always be sure that the correct breaker plate assembly is used. Starting with the year 1937 this important information is incorporated in the technical data, under the heading of "Ignition", on the car wiring diagram pages.

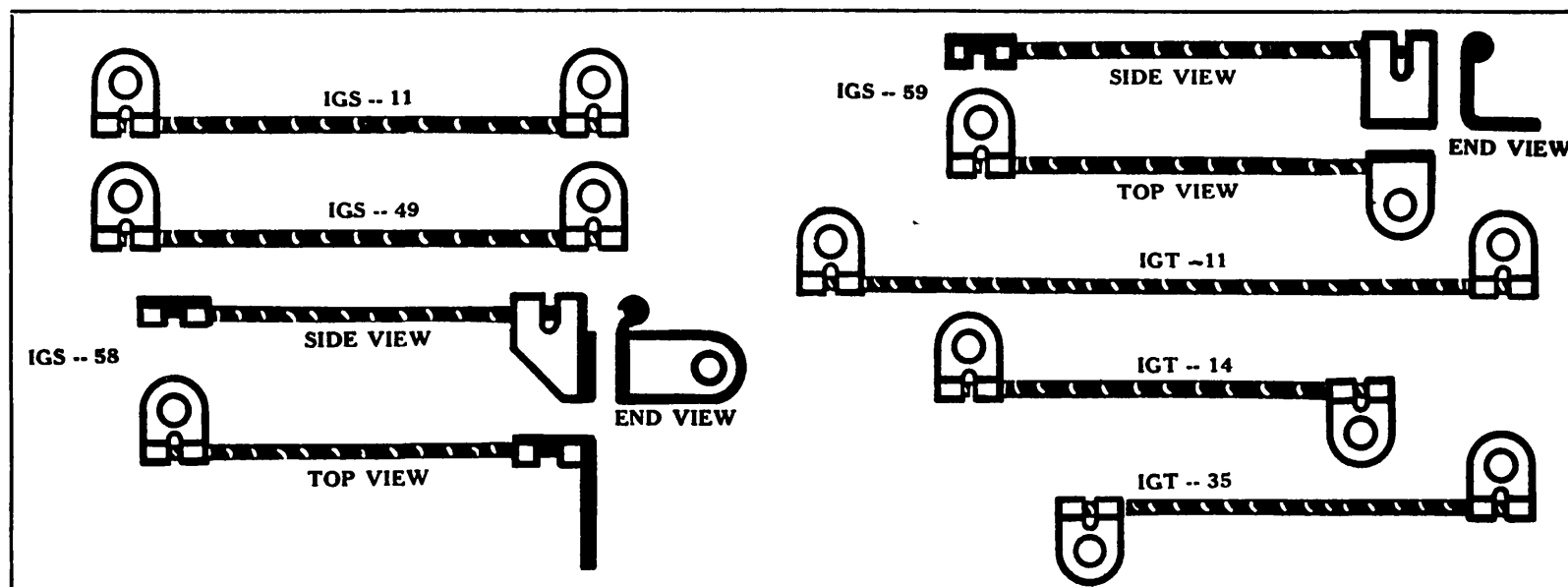


Fig. 25

Life size drawings of the Auto-Lite Flexible Leads used up to the present time (July 1937). Use the improved IGS-59A, IGT-11A, and IGT-14A leads with red insulation and black tracers. (The original leads had black insulation and orange tracers). To identify a Lead match your wires with the drawing. Pay particular attention to the shape of the Terminals on the Leads, and make sure they point in the right direction.

AUTO-LITE FLEXIBLE BREAKER PLATE LEADS.

As explained earlier in this article, failures are apt to occur in the leads used on vacuumatic distributors which connect either the primary terminal to the breaker arm (the insulated lead), or the breaker plate to the breaker sub-plate (the ground lead), as they are both subject to constant flexing due to the vacuum control action on the breaker plate. When replacing use only genuine leads from the bins of the original equipment manufacturers.

Auto-Lite has recently developed a series of flexible leads which, it is hoped, will entirely eliminate failures due to this bending action. While the new leads are still made up with strands of annealed copper wire, the copper is now interwoven with several strands of steel piano wire, which acts as a support. It is believed that this construction will evenly distribute the bending action throughout the entire length of the lead, instead of allowing it to center at one point as it formerly did.

New parts numbers have been assigned as follows:—

IGS-59 superseded by IGS-59-A

IGT-11 superseded by IGT-11A

IGT-14 superseded by IGT-14A

The improved flexible leads may readily be distinguished from the old by the difference in the color of the insulation and the tracer. The insulation on the original leads was black with a red or orange tracer, while the insulation on the new leads is red with a black or yellow tracer. In view of the fact that Auto-Lite vacuumatic distributors are standard equipment on Chrysler, DeSoto, Dodge, Packard, Plymouth and Willys automobiles, special attention should be given to the condition of the flexible leads in distributors on these cars whenever a complaint of poor ignition is made.

1937 Valve and Ignition Timing Specifications

Compiled by Weidenhoff Engineers for use with
Weidenhoff Motor Gauge

1937 Passenger Cars	Adapter	Rod	Stroke	Ignition Timing	Before or After T.D.C.	Spark Retard, Advance or Set	Intake Valve Opens	Before or After T.D.C.	Firing Order	Valve Clearances				Break Contact Separation	Spark Plug Gap (Ins.)
										Timing		Running			
										Int.	Exh.	Int.	Exh.		
BUICK 37-40 Special.....	113	31	4 1/4	.014*	B.T.C.	.....	.053	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.015H	.015H	.015	.024
" 37-60 Century.....	113	38	4-5/16	.040	B.T.C.	.....	.064	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.015H	.015H	.015	.024
" 37-80 Roadmaster.....	113	31	4-5/16	.040	B.T.C.	.....	.064	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.015H	.015H	.015	.024
" 37-90 Limited.....	113	31	4-5/16	.040	B.T.C.	.....	.064	B.T.C.	1-6-2-5-8-3-7-4	.004	.004	.015H	.015H	.015	.024
CADILLAC V-8, 80.....	114	42	4 1/2	.009	B.T.C.	.....	T.D.C.	.....	1-8-7-3-6-5-4-2	.000	.000	A	A	.015	.026
" V-8, 85.....	114	42	4 1/2	.009	B.T.C.	.....	T.D.C.	.....	1-8-7-3-6-5-4-2	.000	.000	A	A	.015	.026
" V-8, 70.....	114	42	4 1/2	.009	B.T.C.	.....	T.D.C.	.....	1-8-7-3-6-5-4-2	.000	.000	A	A	.015	.026
" V-8, 75.....	114	42	4 1/2	.009	B.T.C.	.....	T.D.C.	.....	1-8-7-3-6-5-4-2	.000	.000	A	A	.015	.026
" V-12, 85.....	113	33	4	.030	B.T.C.	.....	T.D.C.	.....	1-4-9-8-5-2-11-10-3-6-7-12	.000	.000	A	A	.021	.026
" V-16, 90.....	113	33	4	.005	B.T.C.	.....	T.D.C.	.....	1-8-9-14-3-6-11-2-15-10-7-4-13-12-5-16	.000	.000	A	A	.016	.026
CHEVROLET Master.....	113	33	3 3/4	.008	B.T.C.	.....	.023	B.T.C.	1-5-3-6-2-4	.006H	.013H	.006H	.013H	.021	.040
" Master, De Luxe.....	113	33	3 3/4	.008	B.T.C.	.....	.023	B.T.C.	1-5-3-6-2-4	.006H	.013H	.006H	.013H	.021	.040
CHRYSLER Royal C-16.....	114-103	42-12	4 1/4	.002	A.T.C.	.....	T.D.C.	.....	1-5-3-6-2-4	.014	.014	.008H	.010H	.020	.025
" Imp. C-14.....	114-103	42-12	4 1/4	.004	A.T.C.	.....	.002	B.T.C.	1-6-2-5-8-3-7-4	.011	.014	.006H	.010H	.018	.025
" Cus Imp. C-17.....	114-103	42-12	4 1/4	.012	A.T.C.	.....	.003	B.T.C.	1-6-2-5-8-3-7-4	.011	.014	.006H	.010H	.018	.025
" Airflow C-17.....	114-103	42-12	4 1/4	.012	A.T.C.	.....	.003	B.T.C.	1-6-2-5-8-3-7-4	.011	.014	.006H	.010H	.018	.025
CORD 812 (Without Supercharger).....	.....	.....	3 3/4	.001	B.T.C.	.....	.014	B.T.C.	1L-3L-4L-2L-2R-1R-3R-4R	.016	.016	.009	.009	.015	.025
CORD 814 (With Supercharger).....	.....	.....	3 3/4	.001	B.T.C.	.....	.014	B.T.C.	4L-4R-1L-3L-3R-2L-2R-1R	.016	.016	.009	.009	.020	.028
DE SOTO 8-3.....	114-103	42-12	4 1/4	.002	A.T.C.	.....	T.D.C.	.....	1-5-3-6-2-4	.014	.014	.008H	.010H	.020	.025
DODGE D-5.....	114-103	42-12	4 1/4	.007	A.T.C.	.....	.012	A.T.C.	1-5-3-6-2-4	.011	.012	.008H	.008H	.020	.025
FORD V-8 60.....	114	40	3.20	.004	B.T.C.	.....	.022	B.T.C.	1-5-4-8-6-3-7-2	.013	.013	.013C	.013C	.015	.025
" V-8 85.....	104	40	3.75	.005	B.T.C.	.....	.026	B.T.C.	1-5-4-8-6-3-7-2	.013	.013	.013C	.013C	.015	.025
GRAHAM Crusader 85.....	114	2	4	T.D.C.	B.T.C.	.....	.007	B.T.C.	1-5-3-6-2-4	.012	.012	.010	.010	.018	.025
" Cavalier 95.....	114	2	4	T.D.C.	.....	.....	.001	A.T.C.	1-5-3-6-2-4	.012	.012	.010	.010	.018	.025
" Supercharger 116.....	114	2	4	.006	A.T.C.	.....	.007	B.T.C.	1-5-3-6-2-4	.012	.012	.010	.010	.018	.025
" Supercharger 120.....	114	2	4 1/4	.006	A.T.C.	.....	.007	B.T.C.	1-5-3-6-2-4	.012	.012	.010	.010	.018	.025
HUDSON 78.....	114	44	5	T.D.C.	.....	.....	.045	B.T.C.	1-5-3-6-2-4	.006H	.008H	.008	.010	.020	.025
" 74-5-6-7.....	114	44	4 1/2	T.D.C.	.....	.....	.039	B.T.C.	1-6-2-5-8-3-7-4	.006H	.008H	.008	.010	.020	.025
LA SALLE V-8, 37-50.....	114	40	4 1/2	.009	B.T.C.	.....	T.D.C.	.....	1-8-7-3-6-5-4-2	A	A	A	A	.015	.026
LINCOLN Zephyr.....	114	40	3.75	.006	B.T.C.	.....	.11	B.T.C.	1-4-9-8-5-2-11-10-3-6-7-12	.013	.013	.013C	.013C	.015	.029
" V-12.....	113	37	4 1/2	T.D.C.	B.T.C.	.....	.15	B.T.C.	1-4-9-8-5-2-11-10-3-6-7-12	A	A	A	A	.020	.030
NASH Lafayette 400, 3710.....	104	40	4 1/2	T.D.C.	.....	.....	.009	A.T.C.	1-5-3-6-2-4	.015H	.015H	.015H	.015H	.022	.025
" Ambassador 6-3720.....	113	37	4 1/4	.010	B.T.C.	.....	.20	B.T.C.	1-5-3-6-2-4	.008H	.015H	.008H	.015H	.022	.025
" Ambassador 8-3780.....	113	37	4 1/4	.033	B.T.C.	.....	.073	B.T.C.	1-6-2-5-8-3-7-4	.008H	.015H	.008H	.015H	.020	.025
OLDSMOBILE F-37.....	114	40	4 1/4	T.D.C.	.....	.....	.008	B.T.C.	1-5-3-6-2-4	.012	.015	.008H	.011H	.020	.040
" F-37.....	114	40	3 3/4	.002	B.T.C.	.....	T.D.C.	.....	1-6-2-5-8-3-7-4	.012	.015	.008H	.011H	.015	.030
PACKARD 8, 115-C (St.Hd.).....	.....	.....	4 1/4	.003	B.T.C.	.....	.008	B.T.C.	1-5-3-6-2-4	.007	.010	.007	.010	.015	.028
" (H. O. Hd.).....	.....	.....	.....	.010	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" 8, 120-C (St.Hd.).....	.....	.....	4 1/4	.019	B.T.C.	.....	.008	B.T.C.	1-6-2-5-8-3-7-4	.007	.010	.007	.010	.015	.028
" (H. O. Hd.).....	.....	.....	.....	.006	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" Super 8 (St.Hd.).....	.....	.....	5	.017	B.T.C.	.....	.....	B.T.C.	1-6-2-5-8-3-7-4	.004	.005	.004	.006	.015	.028
" (H. O. Hd.).....	.....	.....	.....	.007	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" 12 (St. Head).....	.....	.....	4 1/4	.014	B.T.C.	.....	T.D.C.	.....	1R-6L-5R-2L-3R-4L-6R-1L-2R-5L-4R-3L	A	A	A	A	.020	.028
" (H. O. Head).....	.....	.....	.....	.006	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
PIERCE-ARROW 1701.....	114	29	5	.002	A.T.C.	.....	.010	A.T.C.	1-6-2-5-8-3-7-4	.010	.010	A	A	.018	.030
" 1702.....	114	42	4	.009	B.T.C.	.....	.11	B.T.C.	1-4-9-8-5-2-11-10-3-6-7-12	.004	.006	A	A	.018	.030
" 1703.....	114	42	4	.009	B.T.C.	.....	.11	B.T.C.	1-4-9-8-5-2-11-10-3-6-7-12	.004	.006	A	A	.018	.030
PLYMOUTH P-1.....	114-103	42-12	4 1/4	.007	A.T.C.	.....	.012	A.T.C.	1-5-3-6-2-4	.011	.012	.006H	.008H	.020	.025
" De Luxe P-4.....	114-103	42-12	4 1/4	.007	A.T.C.	.....	.012	A.T.C.	1-5-3-6-2-4	.011	.012	.006H	.008H	.020	.025
PONTIAC De L. 8, 37-26 CA.....	114	42	4	.013	B.T.C.	.....	.008	B.T.C.	1-5-3-6-2-4	.015	.015	.012H	.012H	.018	.025
" De L. 8, 37-25 CA.....	114	42	3 3/4	.012	B.T.C.	.....	.008	B.T.C.	1-6-2-5-8-3-7-4	.015	.015	.012H	.012H	.018	.025
STUDEBAKER															
" Dict. & De Luxe 6.....	104	2	4 1/4	.002	B.T.C.	.....	.073	B.T.C.	1-5-3-6-2-4	.020	.020	.016C	.016C	.020	.025
" President.....	104	2	4 1/4	T.D.C.	.....	.....	.073	B.T.C.	1-6-2-5-8-3-7-4	.020	.020	.016C	.016C	.020	.025
TERRAPLANE 11.....	114	43	5	T.D.C.	.....	.....	.045	B.T.C.	1-5-3-6-2-4	.006H	.008H	.008	.010	.020	.025
" 72.....	114	43	5	T.D.C.	.....	.....	.045	B.T.C.	1-5-3-6-2-4	.006H	.008H	.008	.010	.020	.025
WILLYS 37.....	104	2	4 1/4	.010	A.T.C.	.....	T.D.C.	.....	1-3-4-2	.010	.010	.004	.006	.018	.025

EXPLANATION OF ABBREVIATIONS

Adv.—Advanced Spark
A.—Automatic Take-up

A.T.C.—After Top Center
B.T.C.—Before Top Center

H—Hot
C—Cold

T.D.C.—Top Dead Center

*Ignition timing on 1937 Series 40 Buicks changed from 2 degrees B.T.C. to 6 degrees B.T.C. after engine No. 43201034. Both early and late production cars should be timed 6 degrees or .014 B.T.C.

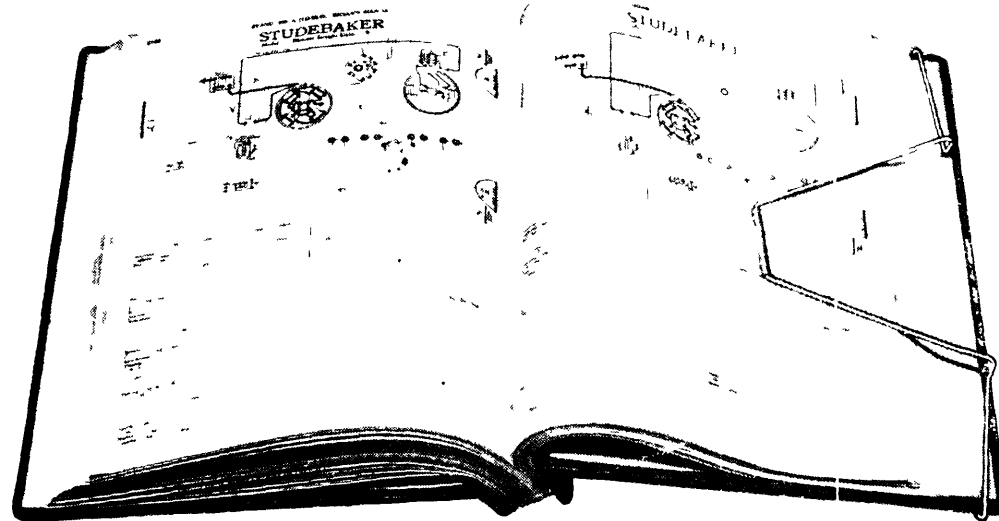
*Pontiac Six—There are two marks "IGN 1 & 6" on flywheel. The first mark is 6 degrees (.013 inch) before T.D.C. The second mark is 2 degrees (.002 inch) before T.D.C. The recommended setting is by the first mark to compensate for wear.

*Pontiac Eight—There are two marks "IGN 1 & 8" on flywheel. The first mark is 6 degrees (.012 inch) before T.D.C. The second mark is 2 degrees (.002 inch) before T.D.C. The recommended setting is by the first mark to compensate for wear.

Note—On Cars using 14 mm. spark plugs, first insert rod through spark plug hole and slip adapter over rod.

Specialized Electrical Service Station Tools

"EAGLE GRIP" PAGE HOLDER



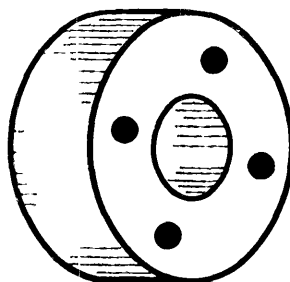
This Holder makes it possible for a mechanic to use both hands while doing generator, distributor, or other bench tests, as the Wiring Manual is held flat open to any given page. With the holder your Manual can be used out of doors, while making electrical check ups on cars, without fear of the wind turning the pages.

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Complete set of new covers, with choice of either a wide or narrow back flap, and a full set of long or short binding screws (for a ten year or a five year Manual), and a new "Eagle Grip" Holder at a price of only.....**\$1.75.**

Shipping Weight, 2 lbs.



MOULDED RUBBER TEST BENCH DRIVE COUPLINGS

For the convenience of our clients we are now carrying a complete line of moulded rubber test bench drive couplings for use on late model Allen, Burton & Rogers, and Hobart equipment.

ALL ALLEN BENCHES

Rubber Drive Coupling No. 52-M-6, for all late type test stands manufactured by the Allen Electric & Equipment Co. Outside diameter $2\frac{1}{2}$ inches, diameter inside hole $\frac{3}{4}$ inch; thickness 1 inch. Four $\frac{7}{16}$ inch holes, spaced 90 degrees apart, on circle with diameter of $1\frac{3}{4}$ inches.

Price each **\$2.65**

ALL BURTON & ROGERS (HEYER SYSTEM) BENCHES

Rubber Drive Coupling No. 105, for all Burton & Rogers or Heyer System test benches. Outside diameter $2\frac{7}{16}$ inches; diameter inside hole $\frac{3}{4}$ inch; thickness $1\frac{1}{4}$ inches. Four $\frac{15}{32}$ inch holes, spaced 90 degrees apart, on circle with diameter of $1\frac{11}{16}$ inches.

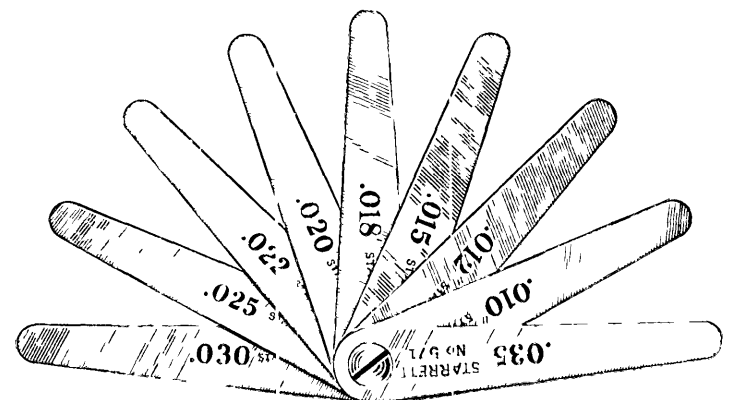
Price each **\$2.25**

ALL LATE MODEL HOBART BENCHES

Rubber Drive Coupling No. AAK-27, for all late type test stands manufactured by Hobart Brothers. Outside diameter $2\frac{3}{4}$ inches; diameter inside hole $\frac{3}{4}$ inch; thickness $1\frac{1}{4}$ inches. Two $\frac{3}{8}$ inch holes and two $\frac{7}{16}$ inch holes, spaced 180 degrees apart, on circle with diameter of $1\frac{3}{4}$ inches.

Price each **\$2.00**

STARRETT NO. 571 AUTO-ELECTRICIAN'S THICKNESS GAUGE



Actual Size

A quality thickness gauge, designed expressly for auto electricians, testers, and mechanics specializing in engine time up and distributor adjusting. The nine tapered leaves give complete coverage for all standard thicknesses now used in adjusting modern ignition distributors, regulators, and spark plugs.

The .012" blade is used in setting the Ford, "Vee" 8 distributors. The .015" blade should be used in adjusting the new and popular eight lobe, single breaker distributors manufactured by Auto Lite and Delco Rayco. The .018", .020" and .022" leaves are for setting four and six cylinder distributors; while the .025", .030" and .035" leaves give complete coverage for all recommended spark plug gaps. A combination of two or more blades takes care of the air gaps, core gaps etc., on the new type voltage regulators.

Price each **\$1.25**

"TRUCENTER" KIT FOR TURNING CENTERLESS ARMATURES

IMPORTANT!

To take care of the new Delco Remy Starting Motor Armatures with a half inch drive end shaft a 500 bushing has been substituted for the now obsolete 472 bushing formerly included.

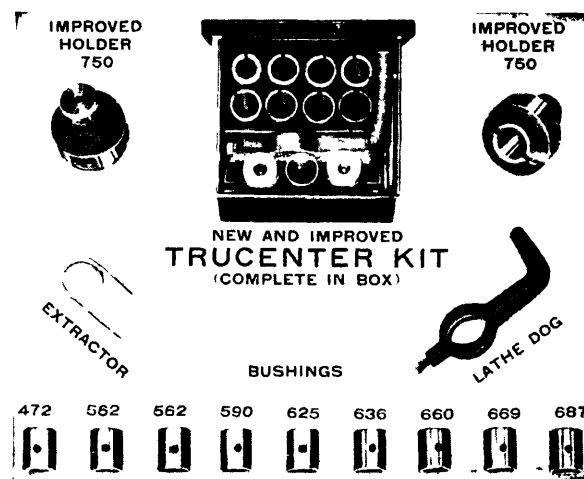


Fig. 1

The Trucenter Armature Turning Kit is sold complete as shown in Figure 1. It consists of two improved, round type holders or chucks, nine accurately ground bushings, a bushing extractor, and a malleable iron lathe dog, all packed in an attractive, as well as a substantial, metal box. The improved holders are designed to allow ample clearance for the lathe tool or undercutting saw, and in addition they are much safer for the lathe operator as, now, there are no sharp revolving corners to be avoided. The Trucenter outfit is unconditionally guaranteed by the manufacturers to within an accuracy of .0015 of an inch and to be free from all defects in material and workmanship. The assortment of nine bushings with correct inside diameters to fit all conventional armatures, in conjunction with the two 750 thousandths holders, makes the instrument absolutely universal. Intermediate size bushings will be made on order to meet the special requirements of repair shops doing a general line of commercial motor work. While the TRUCENTER KIT was originally developed for use on centerless armatures only, this precision tool has since proven so practical that many repair shops now use it on all armatures, to insure positive turning accuracy when working with old, damaged, or battered shafts.

Price Complete, as shown

\$9.75

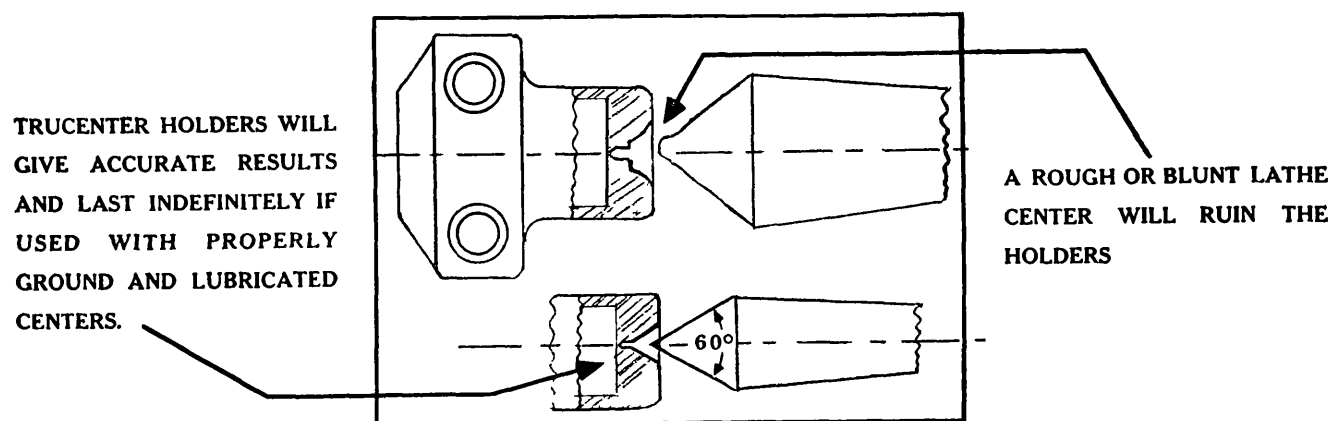
Shipping Weight, 3 lbs

Special Bushings made to order

Price each \$0.80

LATHE CENTER GRINDING SERVICE

If your lathe centers are not in perfect condition, but are blunt, rough, burned, or in an otherwise damaged condition, you not only will find it impossible to do accurate turning on your lathe but if you undertake to run a new Trucenter Kit between them you will ruin the holders the first time they are used.

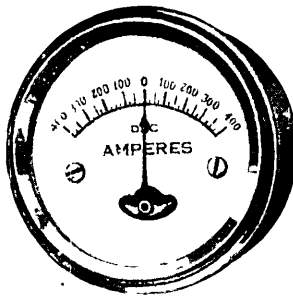


Fully realizing that but few Electrical Service Stations have facilities for accurately grinding lathe centers, we take pleasure in offering a one-day grinding service which will interest you. Arrangements have been made with a local high class grinding establishment to render prompt service on lathe centers. This means that if we receive your lathe centers in the morning's mail they will be ground and returned to you the same day.

Center Grinding (per pair)

\$1.50

STARTER CURRENT INDICATOR

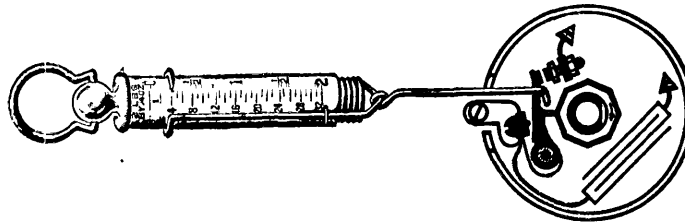


An ideal meter for making quick starting motor tests while unit is still on the car. The scale reads to 400 amps. max., and gives an approximate reading of the current drawn by the starting motor. Easy to use, as it is only necessary to place the back of the meter against any part of the starter cable between the battery and starter to get a reading. A special lug on the back of the instrument fits neatly over the cable. No connections to make. No leads to hook up.

Price each \$3.00

Shipping Weight, 1 lb.

VOLTAGE REGULATOR AND CONTACT SPRING TENSION SCALE

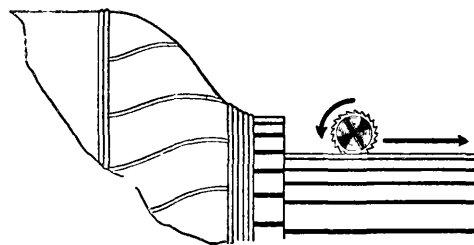


Capacity 2 pounds, graduated in $\frac{1}{4}$ ounces. Made of brass and nickleplated. Very sensitive and accurate.

This scale is suitable for measuring the contact spring tension on the new vibrating point voltage and current regulators. It also can be used for testing contact arm spring tension on distributors and brush tension on both starting motors and generators. These scales are built to Standard Engineering specifications by one of the large spring scale manufacturers.

Price each \$2.25

MICA MILLING CUTTERS (Hullhorst)

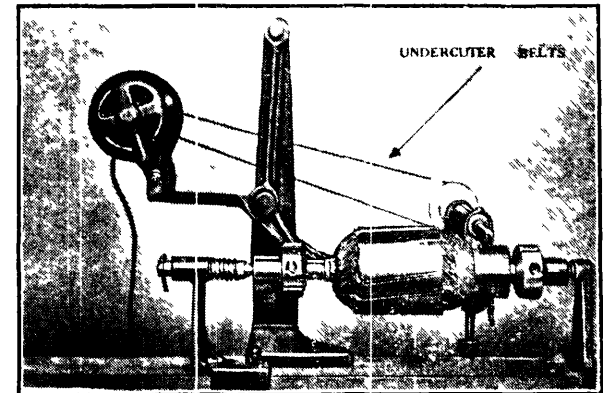


Will fit Burton & Rogers, Allen, Weidenhoff, Hullhorst, and many other power undercutters. Diameter of cutters $\frac{1}{4}$ inch. Made in five thicknesses: .015", .020", .025", .030", .035".

Price each \$0.25

Package of 9 cutters (3-2-2-1-1) \$2.00

BELTS FOR ELECTRICAL SHOP EQUIPMENT



IMPORTANT! When placing an order for belts, specify make and, if possible, the model of equipment on which the belts are to be used. The length of flat belts is determined by doubling them and measuring the distance from crease to crease.

ALLEN BELTS

For Undercutters, "Electrical Laboratory" and Syncrographs. Belt No. 55-E-130-1, Flat, Endless No. 3 thin single "Tontex", $\frac{3}{8}$ inches wide, for Allen Syncrographs, Models E-130, E-131 and E-132. **Price—\$1.45**

Belt No. 55-E-109-1, Round, dyed fabric, $\frac{1}{8}$ inch dia., cut length 19 $\frac{5}{8}$ inches, for Allen, Model E-109, Undercutter.

Price—\$1.45

Belt No. 55-E-240-1, "Vee" $\frac{7}{16}$ inch deep, $\frac{21}{32}$ inch wide at top, 47.1 inch developed pitch length for Allen E-240 "Electrical Laboratory". **Price—\$2.60**

HULLHORST BELTS

Round Leather Belts with Steel Belt Fastener for Hullhorst Undercutters.

Belt No. 7, $\frac{3}{16}$ inch dia., leather, cut length 27 $\frac{1}{4}$ inches.

Price—\$.90

Belt No. 15, $\frac{1}{4}$ inch dia., leather, cut length 34 $\frac{1}{8}$ inches.

Price—\$1.10

WEIDENHOFF BELTS

Flat, Endless Woven Belts, $\frac{3}{8}$ inches wide, for Undercutters and Oscillograph.

Belt No. 1, 11 $\frac{3}{8}$ inches between creases when doubled.

Price—\$1.40

Belt No. 2, 12 inches between creases when doubled.

Price—\$1.40

Belt No. 3, 18 inches between creases when doubled.

Price—\$1.70

JACOBS "CENTER REST" CHUCK FOR TURNING CENTERLESS ARMATURES

NOTE: This device is of interest only to Service Station Operators who are using a regular screw cutting engine lathe which, of course, will mount the new Jacobs "Universal Chuck" on the head stock, and the removal of the center from the tail stock.

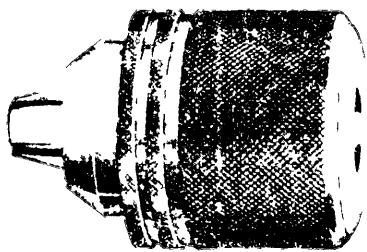


Fig. 1

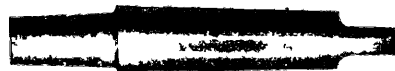


Fig. 2

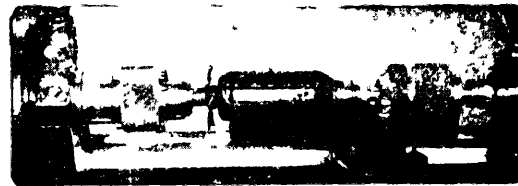


Fig. 3

Figure 1 shows the new Jacobs "Center Rest" Chuck, which is mounted in the tail stock of a lathe, and permits the turning of round work (centerless armatures with a diameter of from $\frac{1}{4}$ inch to $\frac{3}{4}$ inch), without the use of a center. As a matter of fact, even where the armature is provided with a center hole, this is often damaged, and better results will be secured by chucking the shaft. The stationary bronze jaws provide a bearing for the work which is to be turned, and these jaws are adjusted for the diameter of the armature shaft, and locked in place. Actually the chuck replaces the conventional lathe bed Steady Rest. The chuck is easier and more convenient to use, and has equal accuracy.

Figure 2 shows the solid taper arbor for attaching the chuck to the tail stock. Arbors are made with various tapers to fit all makes and model lathes; however, our engineers have found that Morse No. 2 and No. 3 tapers are the most common ones used. For your convenience in ordering, we are printing a template of the Morse tapers (see Fig. 4).

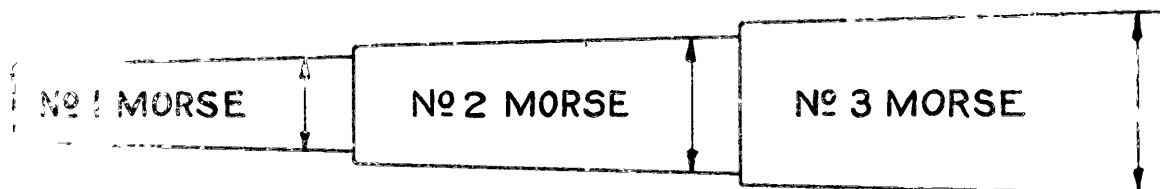


Fig. 4

Take a pair of sharp scissors, and cut along the line. Remove your tail stock center and try the paper template in the hole. From the way it goes in you can determine the taper number. If your taper hole does not conform to any of the three dimensions shown, take it with an accurate measurement of the diameter of the hole at the large end, and the approximate length of the center, and our salesmen will gladly figure out your requirements, advising you as to the slight extra cost, if any, for a special arbor.

Price of Jacobs "Center Rest" Chuck, capacity $\frac{1}{4}$ inch to $\frac{3}{4}$ inch, with solid arbor, either Morse No. 1, No. 2, or No. 3, \$8.75

Shipping Weight, 4 lbs.

LATHE CENTERS



As large as it may sound, not one Electrical Service Station in the country gives any thought to the condition of their lathe centers. As the armature speeds have been stepped up within the last few years to 3600 rpm where it is not uncommon to find them running at 3600 R.P.M. or more. The least eccentricity of the lathe center will result in generator failures and burned commutators. When you order a new set of centers, and keep them for your future turning only. If your old centers are not too bad, use them for rough work, and when straightening shafts. Don't overlook the lathe center grinding service if your centers need grinding.

You have your choice of two grades. First, the Collis Carbon Steel Centers, and second, the Cleveland No. 890 High Speed Steel Centers. For the ordinary Electrical Service Station the Collis Carbon Steel Centers will meet all requirements. They are the best grade and are quite generally used. The Cleveland No. 890 High Speed Steel Centers have high speed points with both ends accurately ground shanks. They can be oper-

ated at high speed rates without danger of burning. While their initial cost is more, with reasonable care they will more than save the difference over a period of time.

COLLIS CARBON STEEL CENTERS

No. 1 Morse Taper.	Price each \$1.70	Per pair \$2.90
No. 2 Morse Taper.	Price each \$1.80	Per pair \$3.10
No. 3 Morse Taper.	Price each \$2.25	Per pair \$4.00

CLEVELAND HIGH SPEED STEEL CENTERS

No. 1 Morse Taper.	Price each \$2.60	Per pair \$4.60
No. 2 Morse Taper.	Price each \$3.00	Per pair \$5.50
No. 3 Morse Taper.	Price each \$4.25	Per pair \$8.00

Refer to Fig. 4 in the Jacobs Center Rest Chuck advertisement above for instructions as how to determine the size taper you require.

1937 Supplement

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Generator, Model 961-K	1454
Generator, Model 1100002	1502

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Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
1448	BUICK	1937	Series 37-40 Special Straight Eight	2999497 and up Motor No. 4-3166225 and up	Delco-Remy 734-Z	Delco-Remy 918-B	Delco-Remy 663-Y
1450		1937	Series 37-60 Cen- tury, 37-80 Road- master, and 37-90 Limited	2999497 and up Motor Nos. 6-3176225, 8-3176225, 9-3176225 and up	Delco-Remy 727-W	Delco-Remy 918-A	Delco-Remy 663-Z, 663-ZX
1452	CADILLAC	1937	Series 37-60, 37-65, "Vee" Eights	6030001 and up 7030001 and up	Delco-Remy 727-V	Delco-Remy 918-C	Delco-Remy 665-G
1454		1937	Series 37-70, 37-75, "Vee" Eights	3130001 and up	Delco-Remy 727-V	Delco-Remy 961-K	Delco-Remy 665-G
1456		1937	Series 85 "Vee" 12	4130001 and up	Delco-Remy 580	Delco-Remy 933-M	Delco-Remy 667-C
1458		1937	Series 90 "Vee" 16	5130301 and up	Delco-Remy 580	Delco-Remy 933-M	Delco-Remy 4118
1460	CHEVROLET	1937	"Master" & "Master DeLuxe", 6 cyl.	GB-1001 and up GA-1001 and up Motor No. 1 and up	Delco-Remy 739-A	Delco-Remy 948-R	Delco-Remy 649-G
1462	CHRYSLER	1937	C-16, "Royal" 6 cyl.	6865101 (Detroit) 9706386 (Canada)	Auto-Lite MAW-4010	Auto-Lite GBW-4803-A	Auto-Lite IGS-4010-1
1464		1937	C-14, "Imperial" 8 cyl.	6719601 (Detroit) 9756331 (Canada)	Auto-Lite MAX-4015	Auto-Lite GCO-4801-C	Auto-Lite IGT-4001-D-1 IGT-4001-G-1 IGT-4001-J-1
1466		1937	C-15, "Custom Imperial", 8 cyl.	7804001 (Detroit) Motor No. C15-1001 and up	Auto-Lite MAX-4003	Auto-Lite GCO-4801-C	Auto-Lite IGT-4001-F-1
1468		1937	C-17, "Airflow" 8 cyl.	7019401 (Detroit) Motor No. C17-1001 and up	Auto-Lite MAX-4003	Auto-Lite GCO-4801-C	Auto-Lite IGT-4001-E-1
See 1936 diagram.	CORD	1937	812 "Vee" 8	812-1001 and up	Auto-Lite MAX-4021	Auto-Lite GBR-4603-4	Auto-Lite IGP-4006
1470		1937	812, "Supercharged" "Vee" 8	812-31001 and up	Auto-Lite MAX-4021	Auto-Lite GBR-4603-4	Auto-Lite IGH-4028
1472	DE SOTO	1937	S-3 6 cyl.	5517301 (Detroit) 9665556 (Canada)	Auto-Lite MAW-4010	Auto-Lite GBW-4803-A	Auto-Lite IGS-4010-1
1474	DODGE	1937	D-5 6 cyl.	4530451 (Detroit) 9409056 (Canada)	Auto-Lite MAW-4010	Auto-Lite GBW-4803-A	Auto-Lite IGS-4002-A-1
1476	FORD	1937	60 H.P., Model 74 85 H. P., Model 78 "Vee" Eights	54-6602 and up (60 H.P.) 18-3331857 and up (85 H.P.)	Ford 18-11002	Ford BB-10000-D (60 H. P.) 40-10000-B (85 H. P.)	Ford 78-12127
1478	GRAHAM	1937	85, "Crusader" 6 cyl.	315001 and up Motor No. 320001 and up	Delco-Remy 738-V	Delco-Remy 936-L	Delco-Remy 623-A
1480		1937	95, "Cavalier" 6 cyl.	215001 and up Motor No. 220001 and up	Delco-Remy 738-T	Delco-Remy 948-B	Delco-Remy 623-A
1482		1937	Series 116, "Supercharged", 6 cyl.	130001 and up Motor No. 135001 and up	Delco-Remy 738-T	Delco-Remy 948-B	Delco-Remy 623-S
1484		1937	Series 120 Custom "Supercharged", 6 cyl.	110001 and up Motor No. 115001 and up	Delco-Remy 738-T	Delco-Remy 948-Z	Delco-Remy 623-S
1486	HUDSON	1937	73 6 cyl.	73101 and up Motor No. 90000 and up	Auto-Lite MAB-4075	Auto-Lite GCJ-4803-A	Auto-Lite IGW-4013-A
1488		1937	74, 75, 76, and 77, 8 cyl.	74101, 75101, 76101, 77101 and up	Auto-Lite MAB-4075	Auto-Lite GCJ-4803-A	Auto-Lite IGP-4008-A
1490	LA SALLE	1937	Series 37-50 "Vee" 8	2230001 and up	Delco-Remy 727-V	Delco-Remy 918-C	Delco-Remy 665-G
1492	LINCOLN	1937	"Vee" 12	K-7500 and up	Auto-Lite MAO-4003-B	Auto-Lite GBC-4103	Auto-Lite IGM-4003, IGM-4003-A
1494	LINCOLN-ZEPHYR	1937	"Vee" 12	H-15529 and up	Zephyr 18-11002	Zephyr 78-10000 HA	Zephyr H-12000
1496	NASH-LAFAYETTE	1937	3710, 6 cyl. "400" Series	L-50781 and up Motor No. LE-50281 and up	Auto-Lite MAB-4076	Auto-Lite GCM-4803-4 GCO-4802	Auto-Lite IGW-4010
1498	NASH	1937	3720 Twin Ign. Six	R-309311 and up Motor No. E-60711 and up	Auto-Lite MAB-4076	Auto-Lite GCO-4802 GCM-4803-4	Auto-Lite IGE-4012-B
1500		1937	3780 Twin Ign. Eight	B-80031 and up Motor No. B-92731 and up	Auto-Lite MAB-4054	Auto-Lite GCO-4802	Auto-Lite IGK-4101

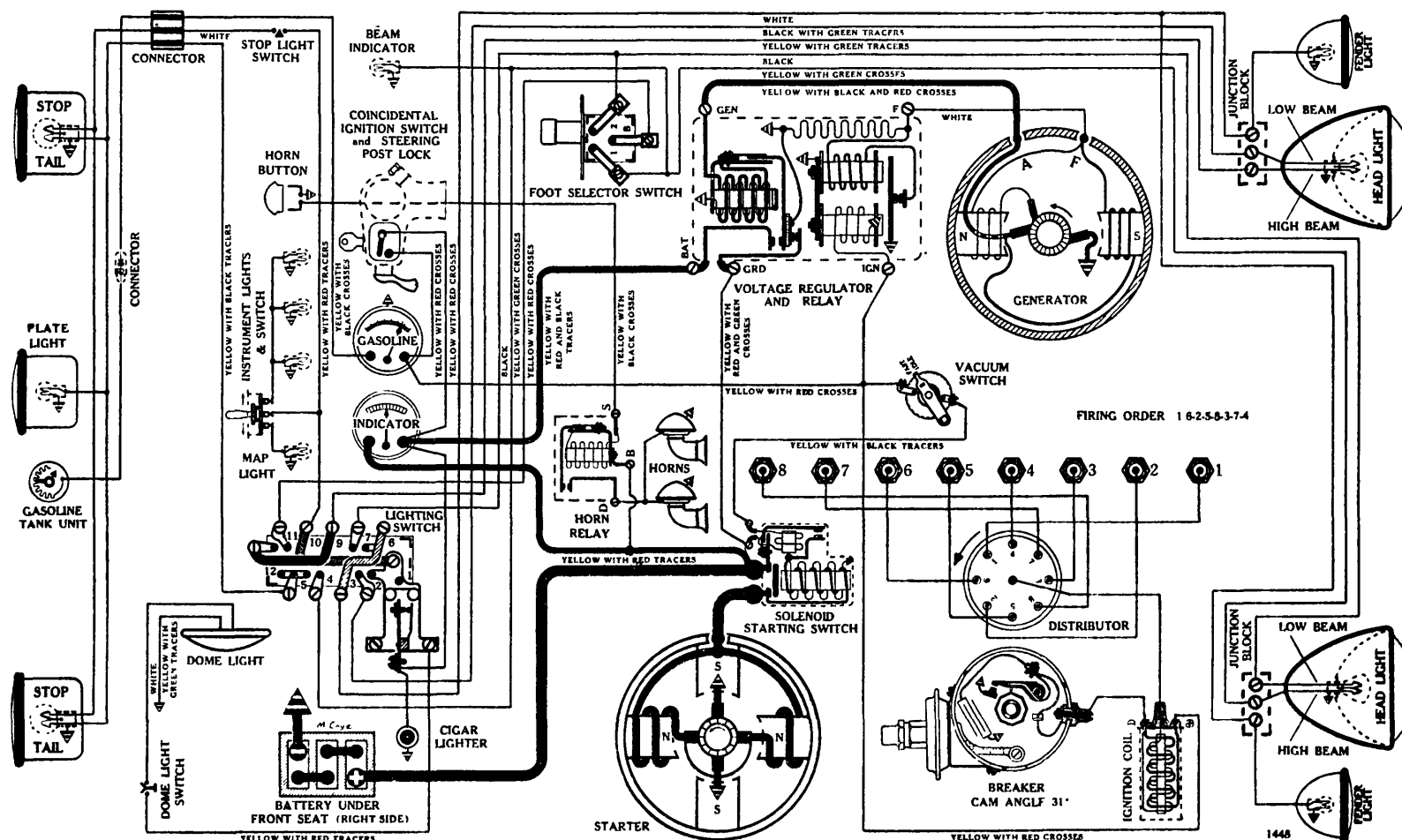
CAR INDEX (continued)

Page	Name of Car	Year	Model	Serial Number and Location	Starter	Generator	Ignition
OLDSMOBILE							
1502		1937	F-37 6 cyl.	F-372001 and up Motor No. F-670001 and up	Delco-Remy 739-G	Delco-Remy 918-H, 936-T 1100002	Delco-Remy 647-F
1504		1937	L-37 8 cyl.	L-146001 and up Motor No. L-250001 and up	Delco-Remy 729-J	Delco-Remy 918-H, 936-T 1100002	Delco-Remy 663-W
PACKARD							
1506		1937	115-C 6 cyl.	Motor No. T-1526 and up	Delco-Remy 739-F	Delco-Remy 948-U	Delco-Remy 647-E
1508		1937	115-C 6 cyl.		Auto-Lite MAX-4006	Auto-Lite GCJ-4801-A	Auto-Lite IGS-4011
1510		1937	120-C, CD and 138-CD, 8 cyls.	Motor No. X-100026 and up	Auto-Lite MAX-4006	Auto-Lite GCJ-4801-A	Auto-Lite IGT-4004
1512		1937	1500, 1501, 1502 Super Eights	Motor No. 395526 and up	Delco-Remy 729-H	Delco-Remy 961-J	Delco-Remy 663-L
1514		1937	1500, 1501, 1502 Super Eights		Auto-Lite MAX-4014	Auto-Lite GCO-4803-A	Auto-Lite IGT-4005
1516		1937	1506, 1507, 1508 "Vee" Twelves	Motor No. 905526 and up	Delco-Remy 664	Delco-Remy 930-F	Auto-Lite IGO-4001-A, IGO-4002-A
1518		1937	1506, 1507, 1508 "Vee" Twelves		Auto-Lite- Owen-Dyneto DN-1389	Auto-Lite GCE-4803-A	Auto-Lite IGO-4001-A, IGO-4002-A
PIERCE-ARROW							
1520		1937	1701 Straight Eight	2610001 and up Motor No. 315001 and up	Auto-Lite- Owen-Dyneto DI-1314	Auto-Lite- Owen-Dyneto CO-1309	Delco-Remy 663-M
1522		1937	1702, 1703 "Vee" Twelves	3170001 and up 3180001 and up Motor No. 409001 and up	Auto-Lite- Owen-Dyneto DI-1313	Auto-Lite- Owen-Dyneto CO-1309	Delco-Remy 4105
PLYMOUTH							
1524		1937	P-3 6 cyl.	1184001 (Detroit) 9376676 (Canada)	Auto-Lite MAW-4009	Auto-Lite GBM-4606-C-1	Auto-Lite IGS-4003-B-1
1526		1937	P-4 6 cyl.	10101001 (Detroit) 9339691 (Canada)	Auto-Lite MAW-4009	Auto-Lite GCJ-4802-A	Auto-Lite IGS-4003-B-1
PONTIAC							
1528		1937	37-26 6 cyl.	6CA-1001 and up Motor No. 6-22001 and up	Delco-Remy 729-E	Delco-Remy 948-S	Delco-Remy 647-D
1530		1937	37-28 8 cyl.	8CA-1001 and up Motor No. 8-83001 and up	Delco-Remy 727-S	Delco-Remy 948-S	Delco-Remy 663-X
STUDEBAKER							
1532		1937	5-A 6 cyl.	5536001 (South Bend) 5852001 (Pacific Coast)	Auto-Lite MAX-4028, MAX-4019	Auto-Lite GBM-4607-A-2	Auto-Lite IGW-4001
1534		1937	6-A 6 cyl.	5255001 (South Bend) 5802001 (Pacific Coast)	Auto-Lite MAX-4028, MAX-4019	Auto-Lite GCM-4802-A-4	Auto-Lite IGW-4001
1536		1937	President 8 cyl.	7111001 (South Bend) 7800801 (Pacific Coast)	Delco-Remy 729-G	Delco-Remy 961-H	Delco-Remy 662-M
TERRAPLANE							
1538		1937	70 and 71 6 cyl.	70101 and up 71101 and up	Auto-Lite MAB-4075	Auto-Lite GCJ-4804-A-1	Auto-Lite IGW-4012-A
1540		1937	72 6 cyl.	72101 and up Motor No. 250000 and up	Auto-Lite MAB-4075	Auto-Lite GCJ-4803-A	Auto-Lite IGW-4013-A
WILLYS							
1542		1937	37 4 cyl.	1001 and up	Auto-Lite MZ-4049	Auto-Lite GAM-4504	Auto-Lite IGS-4007

BUICK

Series 37-40, Special Straight Eight, (1937)

Engine { Bor 3-3/32
Strok 4-1/8



BATTERY

Delco-Remy, 13-J, 6 volts. Negative Terminal Grounded

Starting Capacity—117 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.6

Lighting Capacity—4.9 amps. for 20 hours (98 amp. hour).

Case—Length, 9-1/16; width, 7; height, 9 1/8 inches.

STARTER

D-R Test 402 Rotation, L. H., Com. End Group 38
Delco-Remy, 734-Z

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch, remote control relay (located in solenoid unit), and an auxiliary set of grounding points found on cut-out relay.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Number Teeth on Pinion—9.

Number Teeth on Flywheel—146.

Cranking Ratio—16.22 to 1.

Running Fr —65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—150 amps. at 4.9 volts.

Engine Cranking Speed—84 R.P.M.

Stall Data (on car)—350 amps. at 3.5 volts.

Lock Torque (for test bench use)—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1542.

Starter Vacuum Switch—Delco-Remy, 1607 (with Stromberg Carburetor). Delco-Remy, 1594 (with Marvel Carburetor).

Starter Vacuum Switch Contacts should close when turned through 10 to 14 degrees L. H., viewed from

lever side (1594), R. H. (1607), from latch position. Should require a vacuum of from 3.4 to 4.6 inches of mercury to unlatch vacuum switch from approximately a 30 degree latch position.

Armature—Delco-Remy, 823881.

Armature End Play—.005 to .030 inch.

IGNITION

D-R Test 136 Rotation, L. H., Top View Group 63
Delco-Remy, 663-Y

(Full Automatic Spark Advance in conjunction with Delco-Remy 681-H Vacuum Advance Unit which controls position of Breaker Plate.)

IMPORTANT: The same 663-Y Distributor is used on all 1937 Series 40 Buicks regardless of whether the engine has a Marvel or a Stromberg carburetor.

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—6 degrees before top dead center. **IMPORTANT!** Ignition timing on the 1937 Series 40 Buicks was changed from 2 degrees before T.D.C. to 6 degrees before T.D.C., beginning with engine No. 43201034. All cars with engines below this number should be retimed as follows:—Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "ADV" (cut in flywheel and filled with white paint; located 2 degrees, or slightly less than 1/4 inch, ahead of "upper dead center" mark) registers with line at the flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open. The OCTANE SELECTOR should next be adjusted to zero. Observe position of reference pointer index line on Octane Selector. This line should be at "O" on scale after above timing procedure. If it is not, loosen pointer locking screw, using a 3/16 inch Allen set screw wrench, and bring pointer to correct position. Relock the set screw. The distributor should next be

BUICK

Series 37-40, Special Straight Eight, (1937)

turned two graduations (towards the high side) at the Octane Selector. To do this loosen the two distributor mounting screws, and turn the entire distributor cup. **EXPLANATION:** Each graduation on the Octane Selector scale equals 2 degrees advance at the flywheel. 2 (the number of graduations advance on Selector) times 2 (the number of flywheel degrees each Selector graduation advances the ignition) equals 4; plus 2 (the initial flywheel advance) results in the required 6 degrees advance, now specified by the manufacturers. After the ignition timing is correctly set, again return the index line on Octane Selector to "O" on scale, as previously explained.

CARS WITH ENGINES ABOVE NO. 43201034 ARE PROPERLY MARKED. To time them proceed as follows: Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "ADV" (cut in flywheel and filled with white paint; located 6 degrees or approximately $\frac{3}{4}$ inch ahead of "upper dead center" mark) registers with line at the flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open. The OCTANE SELECTOR should next be adjusted. Observe position of reference pointer index line. This line should be at "O" on scale after above timing procedure. If it is not, loosen pointer locking screw, using a $\frac{3}{16}$ inch Allen set screw wrench, and bring pointer to correct position. Relock the set screw.

Octane Selector Fuel Adjustment—Loosen distributor mounting screws and turn pointer towards the RETARD side on scale for LOW Octane fuel, and toward the ADVANCE side for HIGH Octane fuel. Provision is made for a 10 degree (flywheel) retard or advance at the Octane Selector.

Spark Plugs—18-MM (AC type H-9). Starting July 1937 (AC type 86); Gap .022 to .027 inch.

NOTE:—It occasionally is necessary to set the gap to .030 inch to secure a good idle. A wide gap may result in high speed missing if plugs are poor.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance Unit (Delco-Remy 681-H; test No. 1901)— $6\frac{1}{2}$ degrees (Dist. advance). Starts with vacuum of from 5 to 7 inches mercury. Requires vacuum of from 10 to 13 inches for full travel.

Vacuum Advance Table (Delco-Remy 681-H Vacuum Control).

Inches of Mercury	Degrees Dist. Advance
6.	Start
6.85.....	1
7.70.....	2
8.55.....	3
9.40.....	4
10.25.....	5
11.10.....	6
11.50.....	$6\frac{1}{2}$ (Max.)

Automatic Advance—13 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400.....	200.....	Start
600.....	300.....	2
800.....	400.....	4
1000 (Intermediate)	500.....	6
1660.....	830.....	8
2310.....	1155.....	10
2970.....	1485.....	12
3300 (Max.)	1650.....	13

Condenser—Delco-Remy, 1865972. Capacity .20 to .25 (mfd).

Ignition Coil—Delco-Remy, 536-H. Amperage draw $4\frac{1}{2}$ (engine stopped); $2\frac{1}{2}$ (engine idling).

Primary Resistance at 70° F.—1.23 to 1.33 ohms.

Primary Inductance (M. H. at 2.5 amps., 60 cycl A.C.)—6.4 to 6.9

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301425.

GENERATOR

D-R Test 1632

Group 35-A

Rotation, L. H., Com. End

Delco-Remy, 918-B (Belt Driv)

Unit has a $3\frac{1}{2}$ inch diameter pulley, with a $\frac{3}{4}$ in h groove. This generator is not interchangeable with other 1937 Series Buicks, which have a $\frac{7}{8}$ inch pulley groove.

NOTE:—This is a two pole split field generator. One pole carries a third brush field winding, while the other pole has a straight shunt field winding. The grounding end of both windings is connected to a voltage regulator, through the generator "F" terminal. Two different types of shunt field coils have been built for these generators. The first type, shown on this diagram, developed trouble, the result of the insulated shunt field lead coming in contact with the revolving armature, thereby cutting it off. When this happens the generator output will drop to approximately 10 amps. New type shunt field coils should be used in servicing generators. The field coils should be connected as shown on page 1450. In testing generators of this type ground the "F" terminal, and operate them without the voltage regulator.

Performance Data—Gen. cold. Generator "F" terminal grounded. No voltage regulation.

Amps.	R.P.M.	Volts
0.....	800.....	6.3
2.....	900.....	6.5
4.....	975.....	6.7
6.....	1050.....	6.9
8.....	1150.....	7.1
10.....	1235.....	7.3
12.....	1335.....	7.5
14.....	1475.....	7.6
16.....	1600.....	7.7
18.....	1760.....	7.8
20.....	1925.....	7.9
22.....	2180.....	8.0
24.....	2450.....	8.1
26.....	3100.....	8.3
27.....	4000 (Max.)	8.4

Motoring Freely—4.5 to 7 amps. at 6 volts.

Motoring R.P.M.—900 to 1000 R.P.M. at 6 volts.

Max. Stall Current—28 to 34 amps. at 5 volts.

Field Tests—Shunt Coil, 1.35 to 1.50 amps. at 6 volts.

Third Brush Coil, .83 to .88 amps. at 6 volts.

Total Field Amps., 2.0 to 2.3 amps. at 6 volts.

Field Resistance in Ohms at 75° F.—

Shunt Coil, 4 to 4.25

Third Brush Coil, 6.6 to 7.1

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1866410.

Armature End Play—.005 inch (maximum).

Third Brush—Fixed (no adjustment).

Charging Adjustment—External vibrating-point voltage regulation.

RELAY-REGULATOR

D-R Test 1294 Delco-Remy, 5807

A combination of Cut-Out Relay and Vibrating Voltage Regulator

For Data see page 1450 (Buick 37-60).

LIGHTING

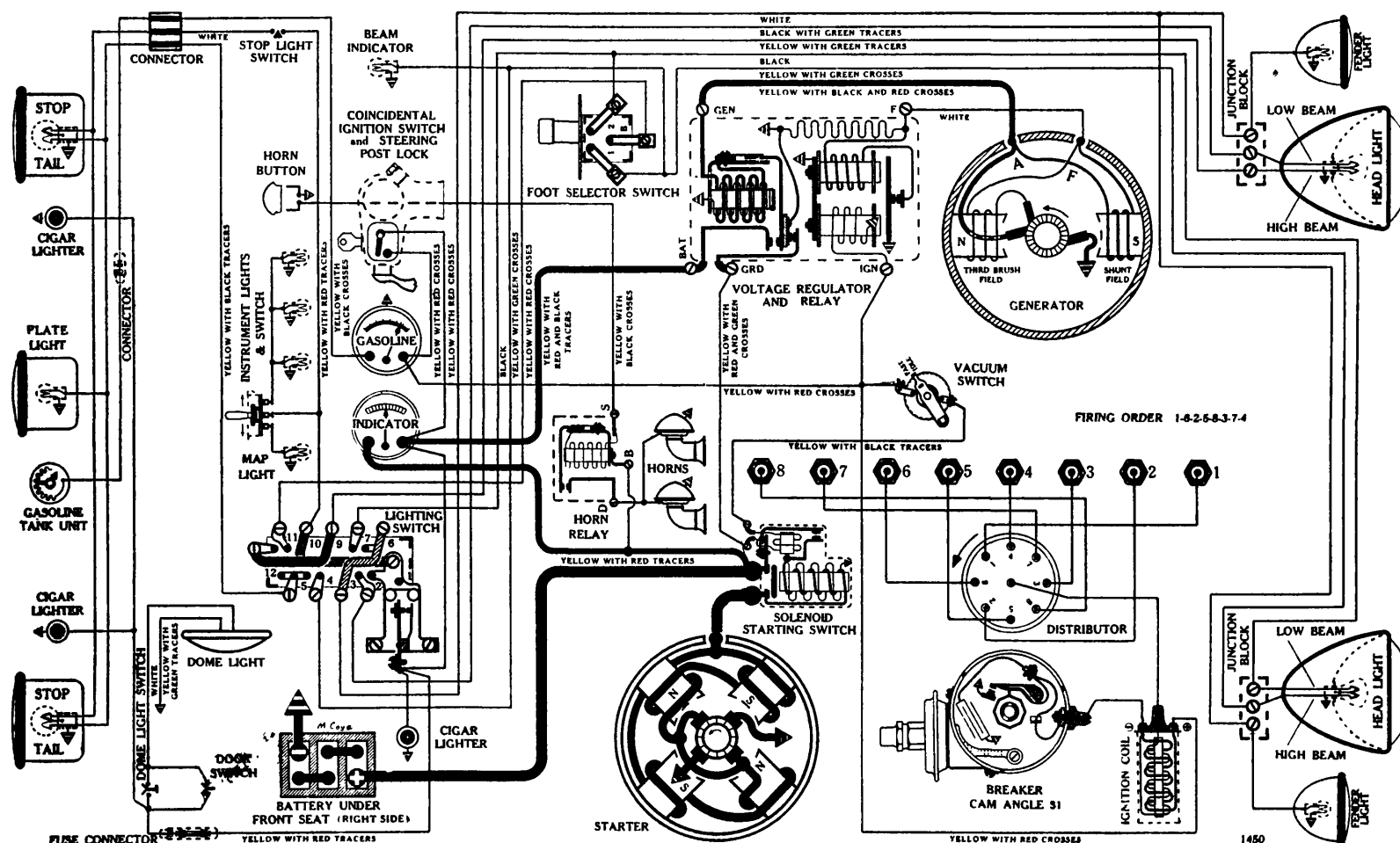
Switch—Delco-Remy, 480-W. A combination lighting switch with overload lighting thermostat.

For Data see page 1450 (Buick 37-60).

BUICK

 Engin { Bore 3-7/16
Strok 4-5/16

Series 37-60 Century, 37-80 Roadmaster and 37-90 Limited, Straight Eights, (1937)



BATTERY

Delco-Remy, 15-G, 6 volts. Negative Terminal Grounded

Starting Capacity—137 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—4.5

Lighting Capacity—5.7 amps. for 20 hours (114 amp. hour).

Case—Length, 10-9/32; width, 7; height, 9 1/8 inches.

STARTER

D-R Test 396 Rotation, L. H., Com. End Group 47
Delco-Remy, 727-W

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch, remote control relay (located in solenoid unit), and an auxiliary set of grounding points found on cut-out relay armature.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Number Teeth on Pinion—9.

Number Teeth on Flywheel—156.

Cranking Ratio—17.33 to 1.

Running Free—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—160 amps. at 4.9 volts.

Engine Cranking Speed—96 R.P.M.

Stall Data (on car)—380 amps. at 3 volts.

Lock Torque (for test bench use)—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1542.

Starter Vacuum Switch—Delco-Remy, 1607 (with Stromberg Carburetor). Delco-Remy, 1594 (with Marvel Carburetor).

Starter Vacuum Switch Contacts should close when turned through 10 to 14 degrees L. H., viewed from lever side (1594), R. H. (1607), from latch position. Should require a vacuum of from 3.4 to 4.6 inches of mercury to unlatch vacuum switch from approximately a 30 degree latch position.

Armature—Delco-Remy, 820158.

Armature End Play—.005 to .030 inch.

IGNITION (With Stromberg Carburetor)

D-R Test 137 Rotation, L. H., Top View Group 63
Delco-Remy, 663-Z

(Full Automatic Spark Advance in conjunction with Delco-Remy 681-H Vacuum Advance Unit which controls position of Breaker Plate.)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—10 degrees before top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "ADV" (cut in flywheel and filled with white paint; located 10 degrees ahead of "upper dead center" mark) registers with line at the flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open. The OCTANE SELECTOR should next be adjusted. Observe position of reference pointer index line. This line should be at "O" on scale after above timing procedure. If it is not, loosen pointer locking screw, using a 3/16 inch Allen set screw wrench, and bring pointer to correct position. Relock the set screw.

Octane Selector Full Adjustment—Loosen distributor mounting screws and turn pointer towards the RETARD side on scale for LOW Octane fuel, and toward the ADVANCE side for HIGH Octane fuel. Provision is made for a 10 degree (flywheel) retard or advance at the Octane Selector.

BUICK

Series 37-60 Century, 37-80 Roadmaster and 37-90 Limited, Straight Eights, (1937)

Spark Plugs—18-MM (AC type H-9). Starting July 1937 (AC type 86); Gap .022 to .027 inch.

NOTE:—It occasionally is necessary to set the gap to .030 inch to secure a good idle. A wide gap may result in high speed missing if plugs are poor.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance Unit (Delco-Remy 681-H; test No. 1901)—6½ degrees (Dist. advance). Starts with vacuum of from 5 to 7 inches mercury. Requires vacuum of from 10 to 13 inches for full travel.

Vacuum Advance Table (Delco-Remy 681-H Vacuum Control).

Inches of Mercury	Degrees Dist. Advance
6.	Start
6.85.....	1
7.70.....	2
8.55.....	3
9.40.....	4
10.25.....	5
11.10.....	6
11.50.....	6½ (Max.)

Automatic Advance—8 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400.....	200.....	Start
600.....	300.....	2
800.....	400.....	4
1000 (Intermediate)	500.....	6
1650 (Max.)	825.....	8

Condenser—Delco-Remy, 1865972. Capacity .20 to .25 (mfd).

Ignition Coil—Delco-Remy, 536-H. Amperage draw 4½ (engine stopped); 2½ (engine idling).

Primary Resistance at 70° F.—1.23 to 1.33 ohms.

Primary Inductance (M. H. at 2.5 amps., 60 cycle A.C.)—6.4 to 6.9.

Ignition Switch—Oakes Steering Post and Ignition Lock. Model 37-60, No. 301425; Models 37-80 and 37-90, No. 301426.

IGNITION (With Marvel Carburetor)

D-R Test 74 Rotation, L. H., Top View Group 63
Delco-Remy, 663-ZX

(Full Automatic Spark Advance in conjunction with Delco-Remy 681-H Vacuum Advance Unit which controls position of Breaker Plate.)

NOTE:—All data for this distributor is the same as for the Delco-Remy 663-Z unit, with the exception of the Automatic Advance characteristics, which are as follows:

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400.....	200.....	Start
600.....	300.....	2
800.....	400.....	4
1000 (Intermediate)	500.....	6
1640.....	820.....	8
2280 (Max.)	1140.....	10

GENERATOR

D-R Test 1632 Group 35-A

Rotation, L. H., Com. End
Delco-Remy, 918-A (Belt Drive)

Unit has a 3½ inch diameter pulley, with a ⅞ inch groove. This generator is not interchangeable with the 1937 Series 40 generator, which has a ¾ inch pulley groove.

NOTE:—This is a two pole split field generator. One pole carries a third brush field winding, while the other pole has a straight shunt field winding. The grounding end of both windings is connected to a voltage regulator, through the generator "F" terminal. Two different types of shunt field coils have been built for these generators. The first type,

shown on page 1448, developed trouble, the result of the insulated shunt field lead coming in contact with the revolving armature, thereby cutting it off. When this happens the generator output will drop to approximately 10 amps. New type shunt field coils should be used in servicing generators. The field coils should be connected as shown on this diagram. In testing generators of this type ground the "F" terminal, and operate them without the voltage regulator.

Performance Data and other Generator values are same as for the Delco-Remy 918-B Generator, Page 1449

RELAY-REGULATOR

D-R Test 1294 Delco-Remy, 5807

A combination of Cut-Out Relay and Vibrating Voltage Regulator

Cut-Out Relay—Closes—6.5 to 7.0 volts.
Opens—0 to 3 amps. discharge at 6.3 volts.

Contact Gap—.018 to .025 inch.

Core Gap—.018 to .022 inch, contacts closed.

Voltage Regulator—Contact Spring Tension—2.7 to 3.5 ounces (minimum).

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Circuit Voltage—This voltage regulator must be adjusted on a closed circuit only.

Voltage Setting—Regulator operates at 7.55 to 7.85 volts, with a generator charging rate of from 8 to 10 amps. (70° F.), and running between 2800 to 3000 R.P.M. Connect voltmeter between terminal marked "Ign" and ground.

Solenoid Relay—(Located in Solenoid Unit):

D-R Test 623 Closes—1.9 volts (max.).

Opens—1.0 to 1.2 volts.

Contact Gap—.025 to .045 inch.

Core Gap—.010 to .013 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 480-W. A combination lighting switch with overload lighting thermostat.

Location—Behind instrument board.

Overload Thermostat—Delco-Remy, 1865577. Contact points open within one minute at 38 amps. load (70° F.). Contacts remain closed with load of 25 amps. (70° F.).

Instrument Light Switch—Delco-Remy, 1404.

Horn Relay—Delco-Remy, 271-A.

Stop Light Switch—Delco-Remy, 476-S.

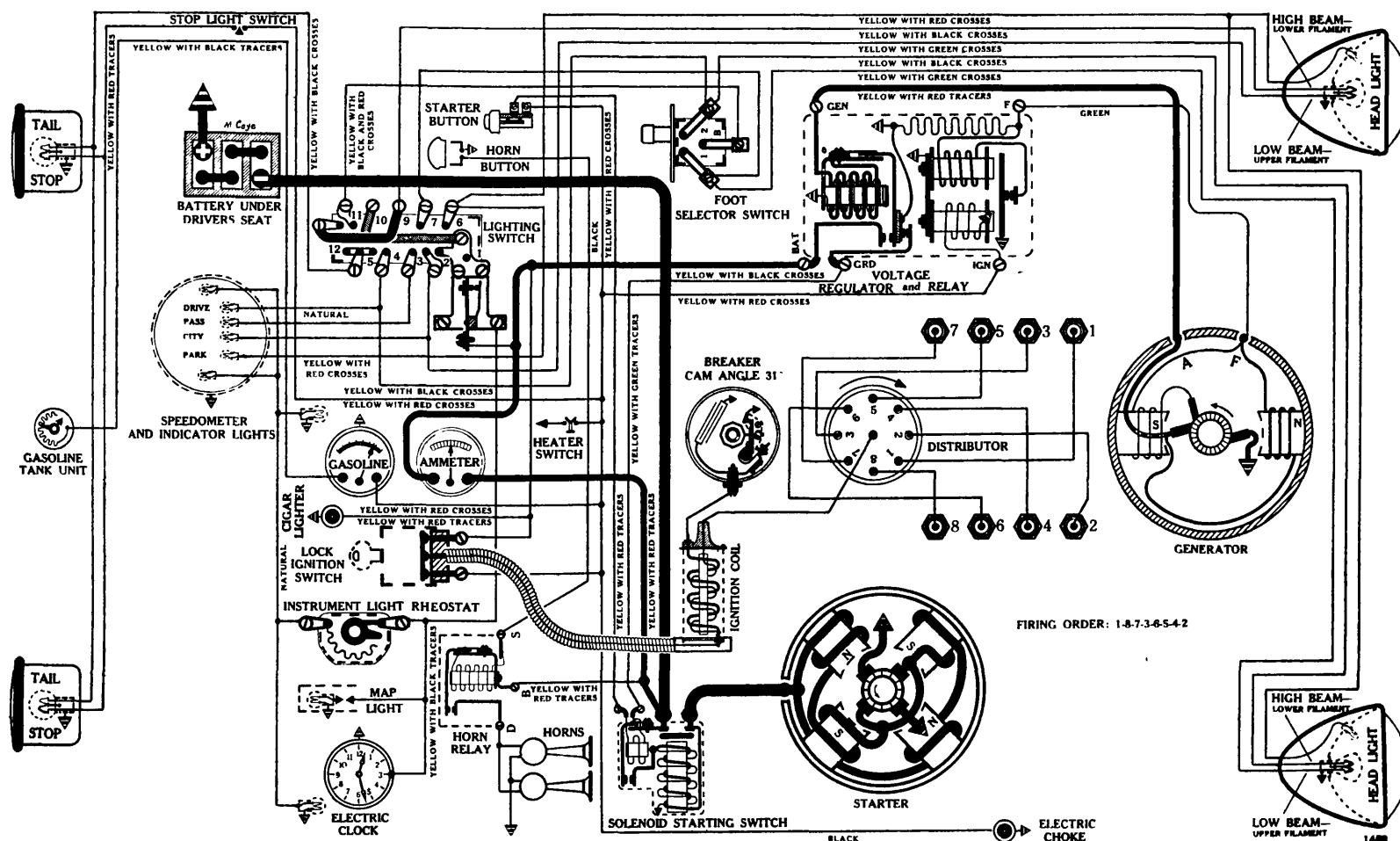
Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2320; FENDER—55; MAP LIGHT—55;
BEAM INDICATOR—51; INSTRUMENT—55;
CLOCK—51; TRUNK COMPARTMENT—55; LICENSE PLATE—63; DOME—81; STOP AND TAIL—1154*.

*A new type bulb with indexed base to fit special socket. Can be inserted in correct position only.

CADILLAC

Series 37-60 and 37-65, 90 D gree "Vee" Eights, (1937)

 Engin { Bor 3-1/2
 Strok 4-1/2


BATTERY

D Ico-Remy, 17-K, 6 volts. Positive Terminal Grounded

Starting Capacity—131 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—4.4.

Lighting Capacity—5.5 amps. for 20 hours (110 amp. hour).

Cas —Length, 10 3/8; width, 7; height, 8 5/8 inches.

STARTER

D-R T st 396 Rotation, L. H., Com. End Group 47
 Delco-Remy, 727-V

Conn ction to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch located on the instrument board, working in conjunction with a remote control relay (located in solenoid unit), and an auxiliary set of grounding points located on cut-out relay armature in the apparatus box. Feed for solenoid control circuit is taken from the ignition switch.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Number Teeth on Pinion—9.

Number Teeth on Flywheel—156.

Cranking Ratio—17.33 to 1.

Running Fre —65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—150 amps. at 5.5 volts.

Engine Cranking Speed—84 R.P.M.

Stall Data (on car)—450 amps. at 4 volts.

Lock Torqu (for test bench use)—16 pound-feet, 600 amps. at 3 volts.

Brush Spring T nsion—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1542.

Push Button Starting Control Switch—Delco-Remy, 1389, Model 37-60; Delco-Remy, 1407, Model 37-65.

Armatur —Delco-Remy, 820158.

IGNITION

D-R Test 135 Rotation, R. H., Top View Group 65

Delco-Remy, 665-G

(Full Automatic Spark Advance)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Distributor Quadrant—Before timing ignition, set pointer in line with "O" graduation on scale.

Timing—5 degrees before top dead center. Slowly turn engine until No. 1 piston (front cylinder, left bank) is coming up on compression stroke. Stop when "IG-A" mark on shaft pulley, located 5 degrees or 1/4 inch ahead of T.D.C., registers with the pointer on the timing chain case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-7); Gap .025 to .027 inch.

Firing Order—1-8-7-3-6-5-4-2.

NOTE:—All odd cylinder numbers on left bank, No. 1 nearest radiator. All even numbers on right bank (see diagram).

Automatic Advance—12 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
870.....	435.....	Start
1390.....	695.....	2
1910.....	955.....	4
2430.....	1215.....	6
2950.....	1475.....	8
3470.....	1735.....	10
4000 (Max.).....	2000.....	12

Condenser—Delco-Remy, 829107.

Ignition Coil—Delco-Remy, 539-C. Amperage draw 4.4 (engine stopped); 2.2 (engine idling).

Ignition Switch and Cable—Delco-Remy, 435-K, Model

CADILLAC

Series 37-60 and 37-65, 90 Degr "Ve " Eights, (1937)

37-60; Delco-Remy, 435-H, Model 37-65.

GENERATOR

D-R Test 1632 Rotation, L. H., Com. End Group 35-A
Delco-Remy, 918-C (Belt Drive)

NOTE:—This is a two pole split field generator. One pole carries a third brush field winding, while the other pole has a straight shunt field winding. The grounding end of both windings is connected to a voltage regulator, through the generator "F" terminal. Two different types of shunt field coils have been built for these generators. The first type, shown on this diagram, developed trouble, the result of the insulated shunt field lead coming in contact with the revolving armature, thereby cutting it off. When this happens the generator output will drop to approximately 10 amps. New type shunt field coils should be used in servicing generators. The field coils should be connected as shown on page 1490 (LaSalle, Series 37-50). In testing generators of this type ground the "F" terminal, and operate them without the voltage regulator.

Performance Data—Gen. cold. Generator "F" terminal grounded. No voltage regulation.

Amps.	R.P.M.	Volts
0.....	800.....	6.3
2.....	900.....	6.5
4.....	975.....	6.7
6.....	1050.....	6.9
8.....	1150.....	7.1
10.....	1235.....	7.3
12.....	1335.....	7.5
14.....	1475.....	7.6
16.....	1600.....	7.7
18.....	1760.....	7.8
20.....	1925.....	7.9
22.....	2180.....	8.0
24.....	2450.....	8.1
26.....	3100.....	8.3
27.....	4000 (Max.).....	8.4

Motoring Freely—4.5 to 7 amps. at 6 volts.

Motoring R.P.M.—900 to 1000 R.P.M. at 6 volts.

Max. Stall Current—28 to 34 amps. at 5 volts.

Field Tests—Shunt Coil, 1.35 to 1.50 amps. at 6 volts.
Third Brush Coil, .83 to .88 amps. at 6 volts.

Total Field Amps., 2.0 to 2.3 amps. at 6 volts.

Field Resistance in Ohms at 75° F.—

Shunt Coil, 4 to 4.25 ohms.

Third Brush Coil, 6.6 to 7.1 ohms.

Brush Spring Tension—Main brushes, 22 to 26 oz.
Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1866789.

Armature End Play—.005 inch (maximum).

Third Brush—Fixed (no adjustment).

Charging Adjustment—External vibrating-point voltage regulation.

RELAY-REGULATOR

D-R Test 1294 Delco-Remy, 5817

A combination of Cut-Out Relay and Vibrating Voltage Regulator

Cut-Out Relay—Closes—6.5 to 7.0 volts.
Opens—0 to 3 amps. discharge at 6.3 volts.
Contact Gap—.018 to .025 inch.
Core Gap—.018 to .022 inch, contacts closed.

Voltage Regulator—Contact Spring Tension—2.7 to 3.5 ounces (minimum).

Gap Between Fiber Bump r and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Circuit Voltage—This voltage regulator must be adjusted on a closed circuit only.

Voltage Setting—Regulator operates at 7.55 to 7.85 volts, with a generator charging rate of from 8 to 10 amps. (70° F.), and running between 2800 to 3000 R.P.M. Connect voltmeter between terminal marked "Ign." and ground.

Solenoid Relay—(Located in Solenoid Unit):

D-R Test 623

Closes—1.9 volts (max.).

Opens—1.0 to 1.2 volts.

Contact Gap—.025 to .045 inch.

Core Gap—.010 to .013 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 480-S. A combination switch with overload lighting thermostat.

Location—Behind instrument board.

Overload Thermostat—Delco-Remy, 1866707. Contact points open within one minute at 38 amps. load (70° F.). Contacts remain closed with load of 25 amps. (70° F.).

Horn Relay—Delco-Remy, 271-A.

Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section.

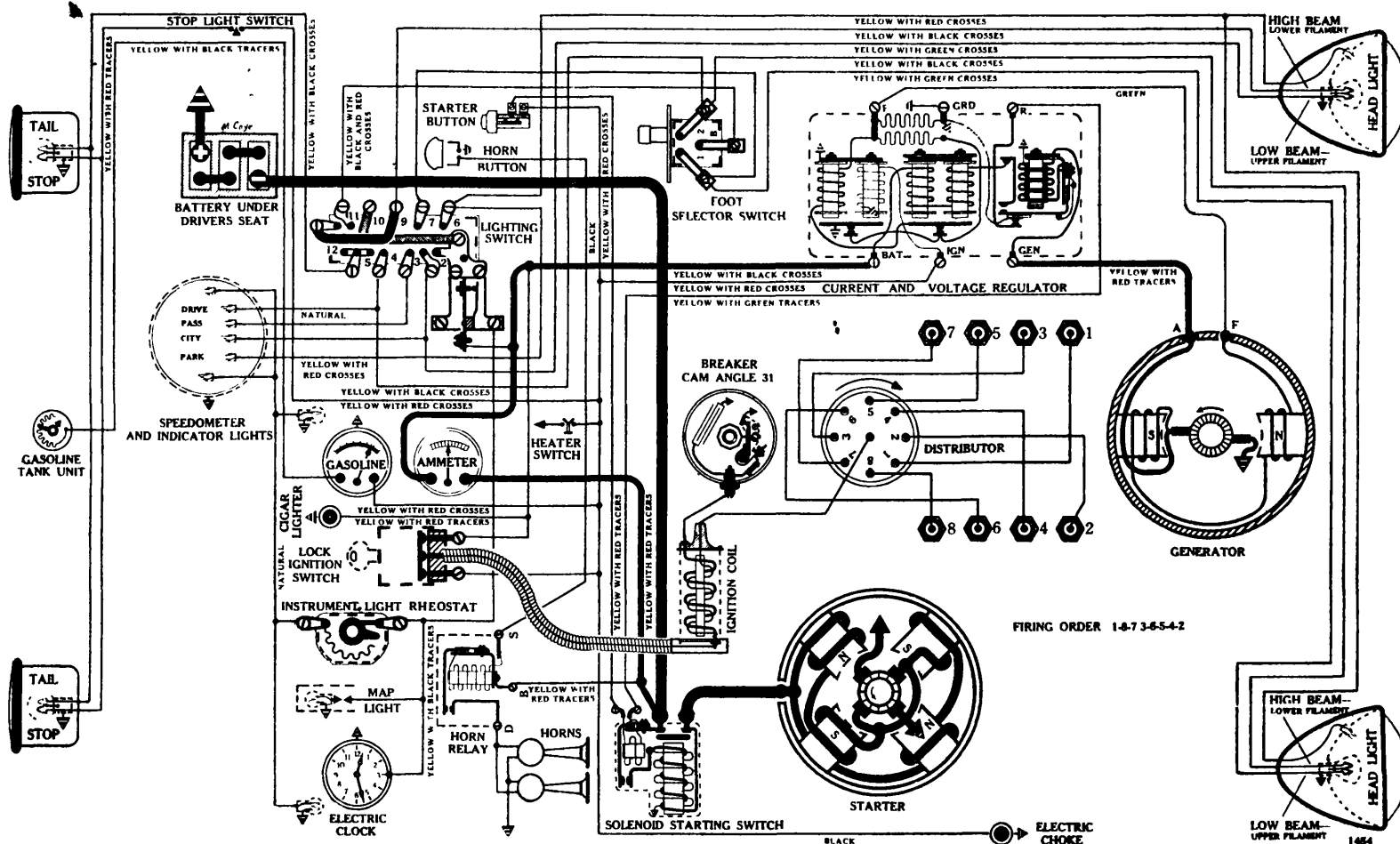
HEAD—2330 (2580 with 32-50 C.P. filament in right head lamp when State laws permit); PARK—55; MAP LIGHT—63; BEAM INDICATORS—51; INSTRUMENT—55; CLOCK—51; DOME—87; LICENSE PLATE—63; STOP AND TAIL—1154*.

*A new type bulb with indexed base to fit special socket. Can be inserted in correct position only.

CADILLAC

 Engin { Bor 3-1/2
Strok 4-1/2

Series 37-70 and 37-75, 90 D gree "Vee" Eights, (1937)



BATTERY

D lco-R my, 17-D, 6 volts. Positive Terminal Grounded

Starting Capacity—156 amps. for 20 minutes

Minut s of Discharge at 300 Amps., Zero Degrees F.—5.5.

Lighting Capacity—6.5 amps. for 20 hours (130 amp. hour).

Case—Length, 11 1/4; width, 7; height, 9 3/8 inches.

STARTER

D-R T st 396 Rotation, L. H., Com. End Group 47
Delco-Remy, 727-V

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch located on the instrument board, working in conjunction with a remote control relay (located in solenoid unit), and an auxiliary set of grounding points located on cut-out relay armature in the apparatus box. Feed for solenoid control circuit is taken from the ignition switch.

Start r Pinion and Clutch Assembly—Delco-Remy, 1843041.

Number Teeth on Pinion—9.

Number Teeth on Flywheel—156.

Cranking Ratio—17.33 to 1.

Running Fr —65 amps. at 5 volts, 5500 R.P.M.

Cranking Engin —150 amps. at 5.5 volts.

Engin Cranking Sp ed—84 R.P.M.

Stall Data (on car)—450 amps. at 4 volts.

Lock Torqu (for t st bench use)—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1542.

Push Button Starting Control Switch—Delco-Remy, 1407.

Armature—Delco-Remy, 820158.

IGNITION

D-R Test 135 Rotation, R. H., Top View Group 65
Delco-Remy, 665-G

(Full Automatic Spark Advance)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Distributor Quadrant—Before timing ignition, set pointer in line with "O" graduation on scale.

Timing—5 degrees before top dead center. Slowly turn engine until No. 1 piston (front cylinder, left bank) is coming up on compression stroke. Stop when "IG-A" mark on shaft pulley, located 5 degrees or 1/4 inch ahead of T.D.C., registers with the pointer on the timing chain case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-7); Gap .025 to .027 inch.

Firing Order—1-8-7-3-6-5-4-2.

NOTE:—All odd cylinder numbers on left bank, No. 1 nearest radiator. All even numbers on right bank (see diagram).

CADILLAC

Series 37-70 and 37-75, 90 Degree "V" Eights, (1937)

Automatic Advance—12 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
870.....	435.....	Start
1390.....	695.....	2
1910.....	955.....	4
2430.....	1215.....	6
2950.....	1475.....	8
3470.....	1735.....	10
4000 (Max.).....	2000.....	12

Condenser—Delco-Remy, 829107.

Ignition Coil—Delco-Remy, 539-C. Amperage draw 4.4 (engine stopped); 2.2 (engine idling).

Ignition Switch and Cable—Delco-Remy, 435-H.

GENERATOR

D-R Test 1630 Rotation, L. H., Com. End Group 61
Delco-Remy, 961-K (Belt Drive)

NOTE:—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating-point current and voltage regulators. The regulator should be used when testing this generator. The following performance readings were taken with the voltage regulator points short-circuited together, and the maximum generator output controlled by the vibrating-point current regulator.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	675.....	6.40
2.....	730.....	6.50
4.....	780.....	6.65
6.....	835.....	6.80
8.....	890.....	6.90
10.....	950.....	7.05
12.....	1020.....	7.18
14.....	1090.....	7.30
16.....	1175.....	7.40
18.....	1260.....	7.55
20.....	1355.....	7.70
22.....	1460.....	7.80
24.....	1575.....	7.90
25.....	1650 (Max.).....	8.00

Motoring Freely— $3\frac{1}{2}$ to $3\frac{3}{4}$ amps. at 6 volts, 450 R.P.M.

Max. Stall Current—26 to 28 amps. at 5 volts.

Field Test—2 to 2.2 amps. at 6 volts across field coils in series.

Brush Spring Tension—22 to 26 oz. on each (new brushes).

Armature—Delco-Remy, 1857866.

Charging Adjustment—No third brush. External vibrating-point current and voltage regulation.

RELAY-REGULATORS

D-R Test 1419 Delco-Remy, 5818

A combination Cut-Out Relay, Vibrating Current, and Vibrating Voltage Regulators with two Field Resistance Units (D-R 1865615 inner; 1858018 outer Resistances).

Cut-Out Relay—
Closes—6.5 to 7.0 volts.
Opens—0 to 3 amps. discharge at 6.3 volts.
Contact Gap—.018 to .025 inches.
Core Gap—.018 to .022 inches, contacts closed.

Current Regulator—Contact Spring Tension — 3.5 ounces (minimum).

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.070 to .080 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Amperes Charge—24.0 to 26.0 at 70° F.

Voltage Regulator—IMPORTANT! While making voltage regulator tests short circuit current regulator with jumper across contact points.

Contact Spring Tension — 3.5 ounces (minimum).

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Circuit Voltage—This voltage regulator must be adjusted on a closed circuit only.

Voltage Setting—Regulator operates at 7.55 to 7.85 volts, with a generator charging rate of from 8 to 10 amps. (70° F.), and running between 2800 and 3400 R.P.M. Connect voltmeter between terminal marked "Ign." and ground.

Solenoid Relay—
D-R Test 623

(Located in Solenoid Unit):

Closes—1.9 volts (max.).

Opens—1.0 to 1.2 volts.

Contact Gap—.025 to .045 inch.

Core Gap—.010 to .013 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 480-S. A combination switch with overload light ng thermostat.

Location—Behind instrument board.

Overload Thermostat—Delco-Remy, 1866707. Contact points open within one minute at 38 amps. load (70° F.). Contacts remain closed with load of 25 amps. (70° F.).

Horn Relay—Delco-Remy, 271-A.

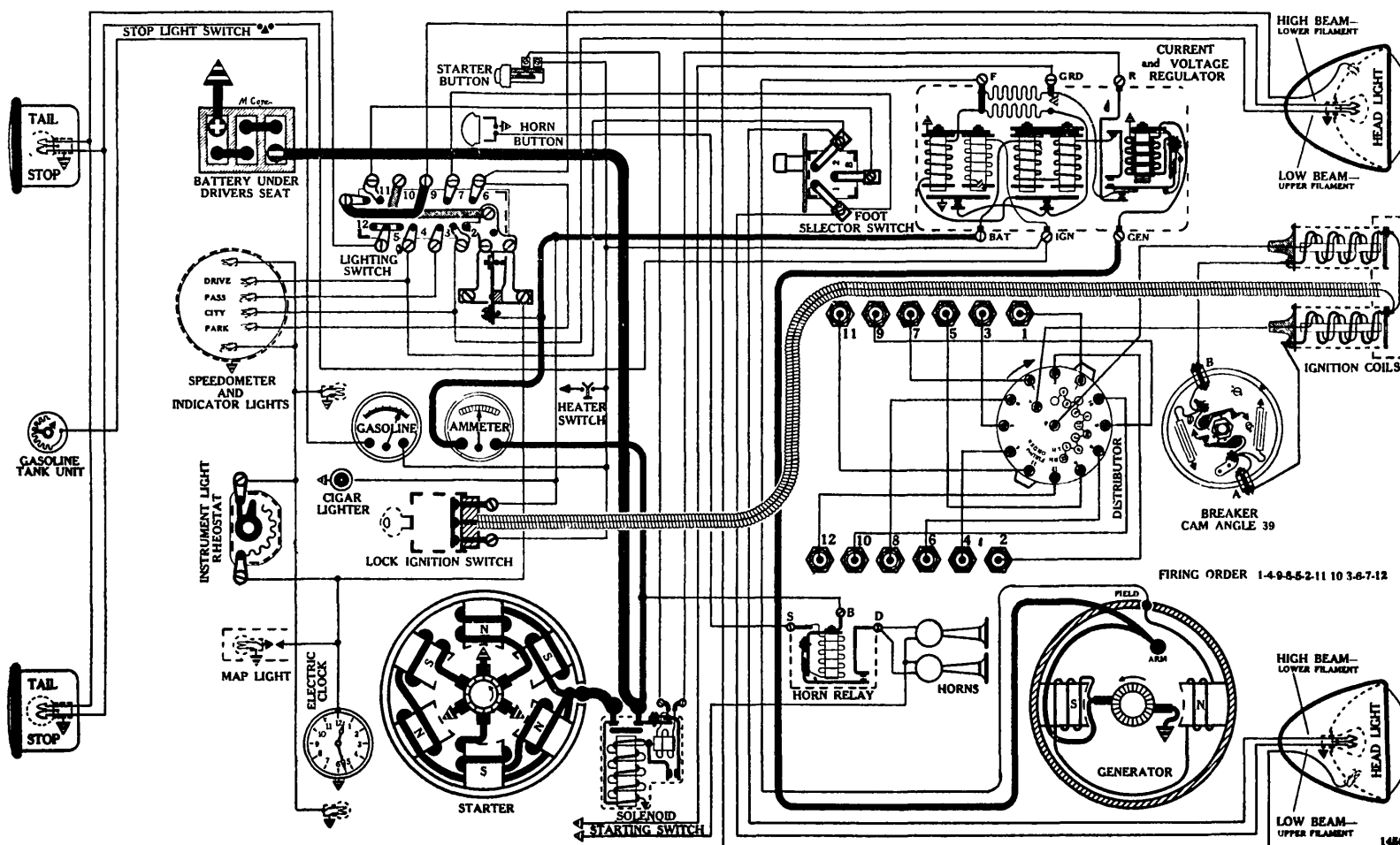
Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2330 (253) with 32-50 C.P. filament in right head lamp when State laws permit); PARK—55; MAP LIGHT—63; BEAM INDICATORS—51; INSTRUMENT—55; CLOCK—51; DOME—87; LICENSE PLATE—63; STOP AND TAIL—1154*.

*A new type bulb with indexed base to fit special socket. Can be inserted in correct position only.

CADILLAC

Series 37-85, 45 Degree "Vee" 12, (1937)

Engine { Bore 3-1/8
Stroke 4

BATTERY

Delco-Remy, 21-D, 6 volts. Positive Terminal Grounded

Starting Capacity—195 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—7.1

Lighting Capacity—8.2 amps. for 20 hours (164 amp. hour).

Case—Length, 13-9/16; width, 7; height, 9-3/16 inches.

STARTER

D-R Test 405 Rotation, L. H., Com. End Group 17
Delco-Remy, 580

Connection to Engine—Mechanical pinion shift with self-contained gear reduction and over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch located on the instrument board, working in conjunction with a remote control relay (located in solenoid unit), and an auxiliary set of grounding points located on cut-out relay armature in the apparatus box. Feed for solenoid control circuit is taken from the ignition switch.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843058.

Number Teeth on Pinion—9.

Number Teeth on Flywheel—113.

Cranking Ratio—21 to 1 (armature to flywheel).

Running Fr —70 amps. at 5.7 volts, 2200 R.P.M.

Cranking Engine—140 amps. at 5.8 volts.

Engine Cranking Speed—72 R.P.M.

Stall Data (on car)—500 amps. at 4.5 volts.

Lock Torque (for test bench use)—35 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—36 to 40 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1515.

Push Button Starting Control Switch—Delco-Remy, 1407.

Armature—Delco-Remy, 1837058.

IGNITION

D-R Test 1044 Rotation, R. H., Top View Group 67
Delco-Remy, 667-C

(Full Automatic Spark Advance)

Breakers—Contact separation .018 inch.

Cam Angles—Points closed 36 degrees; open 24 degrees.

NOTE—Diagram shows 39 degrees cam angle, which was official up to June 1937. Delco-Remy Bulletin 1D-180 date 5-20-37 specifies 36 degrees.

Contact Spring Tension—17 to 21 oz. on each.

Synchronizing—Stationary points fire left hand block. Movable points open 37½ degrees after stationary. Unequal intervals of 37½-22½-37½, etc. degrees between interruptions.

Timing—10 degrees before top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "IG-A" (which is 10 degrees ahead of T.D.C.) is opposite indicator. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—18-MM (AC type G-7); Gap .025 to .027 inch.

Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.

NOTE—All odd cylinder numbers on left bank, No. 1 nearest radiator. All even numbers on right bank (see diagram).

CADILLAC

S r i s 37-85, 45 D gre "Ve " 12, (1937)

Automatic Advance—19 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
510.....	255.....	Start
690.....	345.....	2
870.....	435.....	4
1060.....	530.....	6
1240.....	620.....	8
1420.....	710.....	10
1600 (1st Intermediate)	800.....	12
1900.....	950.....	14
2200 (2nd Intermediate)	1100.....	16
2600.....	1300.....	18
2800 (Max.)	1400.....	19

Condensers—Delco-Remy, 1837231.
Ignition Coil—Delco-Remy, 553-E. Amperage draw 4.4 (engine stopped); 2.2 (engine idling).
Ignition Switch and Cable—Delco-Remy, 435-J.

GENERATOR

D-R Test 1602 Rotation, L. H., Com. End Group 28
 Delco-Remy, 933-M (Belt Drive)

NOTE:—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating-point current and voltage regulators. The regulator should be used when testing this generator. The following performance readings were taken with the voltage regulator points short circuited together, and the maximum generator output controlled by the vibrating-point current regulator.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	650.....	6.5
2.....	680.....	6.6
4.....	720.....	6.7
6.....	755.....	6.8
8.....	800.....	6.9
10.....	840.....	7.
12.....	890.....	7.1
14.....	940.....	7.2
16.....	1000.....	7.3
18.....	1060.....	7.4
20.....	1130.....	7.5
22.....	1250 (Max.)	7.6

Motoring Freely—2.7 to 3 amps. at 6 volts.

Max. Stall Current—22 to 24 amps. at 5 volts.

Field Test—1.7 to 2.0 amps. at 6 volts across field coils in series.

Brush Spring Tension—22 to 26 oz. on each (new brushes).

Armature—Delco-Remy, 1854448.

RELAY-REGULATORS

D-R Test 1419 Delco-Remy, 5818

A combination Cut-Out Relay, Vibrating Current, and Vibrating Voltage Regulators with two Field Resistance Units (D-R 1865615 inner; 1858018 outer Resistances).

Cut-Out Relay—
Closes—6.5 to 7.0 volts.
Opens—0 to 3 amps. discharge at 6.3 volts.
Contact Gap—.018 to .025 inches.
Core Gap—.018 to .022 inches, contacts closed.

Current Regulator—**Contact Spring Tension** — 3.5 ounces (minimum).

Gap Between Fiber Bump r and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.070 to .080 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Amperes Charge—24.0 to 26.0 at 70° F.

Voltage Regulator—**IMPORTANT!** While making voltage regulator tests short circuit current regulator with jumper across contact points.

Contact Spring Tension — 3.5 ounces (minimum).

Gap Between Fiber Bump r and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Circuit Voltage—This voltage regulator must be adjusted on a closed circuit only.

Voltage Setting—Regulator operates at 7.55 to 7.85 volts, with a generator charging rate of from 8 to 10 amps. (70° F.), and running between 2800 and 3400 R.P.M. Connect voltmeter between terminal marked "Ign." and ground.

Solenoid Relay— (Located in Solenoid Unit):
D-R Test 613

Closes—3.2 volts (max.).

Opens—1.6 to 2.0 volts.

Contact Gap—.030 to .045 inch.

Core Gap—.010 to .014 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 480-S. A combination switch with overload lighting thermostat.

Location—Behind instrument board.

Overload Thermostat—Delco-Remy, 1866707. Contact points open within one minute at 38 amps. load (70° F.). Contacts remain closed with load of 25 amps. (70° F.).

Horn Relay—Delco-Remy, 271-A.

Foot Selector Switch—Delco-Remy, 471-T.

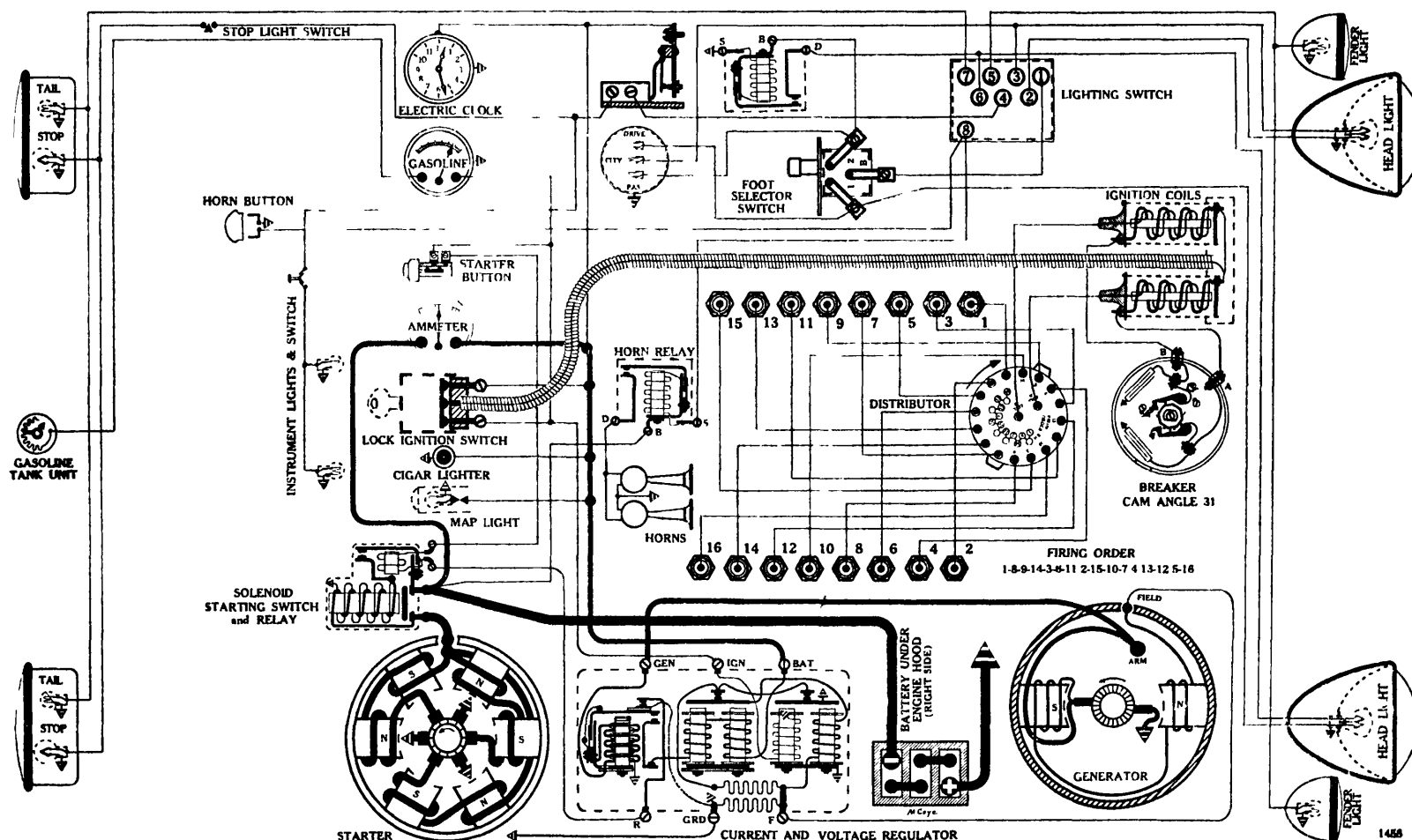
Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2330 (2530 with 32-50 C P. filament in right head lamp when State laws permit); **PARK**—55; **MAP LIGHT**—63; **BEAM INDICATORS**—51; **INSTRUMENT**—55; **CLOCK**—51; **DOVE**—87; **LICENSE PLATE**—63; **STOP AND TAIL**—1154*.

*A new type bulb with indexed base to fit special socket. Can be inserted in correct position only.

CADILLAC

 Engine { Bore 3
Stroke 4

Series 37-90, 45 Degree "Vee" 16, (1937)



BATTERY

Delco-Remy, 25-A, 6 volts. Positive Terminal Grounded

Starting Capacity—234 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—9.5

Lighting Capacity—9.8 amps. for 20 hours (196 amp. hour).

Case—Length, 16-3/16; width, 7; height, 9-5/32 inches.

STARTER

D-R T st 405 Rotation, L. H., Com. End Group 17
Delco-Remy, 580

Connection to Engine—Mechanical pinion shift with self-contained gear reduction and over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch located on the instrument board, working in conjunction with a remote control relay (located in solenoid unit), and an auxiliary set of grounding points located on cut-out relay armature in the apparatus box. Feed for solenoid control circuit is taken from the ignition switch.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843058.

Number Teeth on Pinion—9.

Number Teeth on Flywheel—113.

Cranking Ratio—21 to 1 (armature to flywheel).

Pulling Fre—70 amps. at 5.7 volts, 2200 R.P.M.

Cranking Engine—150 amps. at 5.8 volts.

Engine Cranking Speed—84 R.P.M.

Stall Data (on car)—550 amps. at 4.6 volts.

Lock Torque (for test bench use)—35 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—36 to 40 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1515.

Push Button Starting Control Switch—Delco-Remy, 1379.

Armature—Delco-Remy, 1837058.

IGNITION

D-R Test 1043 Rotation, R. H., Top View Group 26
Delco-Remy, 4118

(Full Automatic Spark Advance)

Breakers—Contact separation .014 to .018 inch.

Cam Angles—Points closed 31 degrees; open 16 degrees.

Contact Spring Tension—17 to 21 oz. on each.

Synchronizing—Stationary points fire left hand block. Movable points open 22½ degrees after stationary. Equal 22½ degree intervals between interruptions.

Timing—4 degrees before top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "IG-A" (which is 4 degrees or approximately ½ inch ahead of T.D.C.) is opposite indicator. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—18-MM (AC type G-6); Gap .025 to .027 inch.

Firing Order—1-8-9-14-3-6-11-2-15-10-7-4-13-12-5-16.

NOTE:—All odd cylinder numbers on left bank, No. 1 nearest radiator. All even numbers on right bank (see diagram).

Automatic Advance—17 degrees (Distributor).

NOTE:—While Delco-Remy specify an "intermediate" in the following table, when plotted out on coordinate

CADILLAC

Series 37-90, 45 Degree "V" 16, (1937)

paper the advance is not a "dog-leg" but a "straight" curve.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
260.....	130.....	Start
480.....	240.....	2
710.....	355.....	4
940.....	470.....	6
1170.....	585.....	8
1200 (Intermediate)	600.....	8.25
1400.....	700.....	10
1620.....	810.....	12
1850.....	925.....	14
2080.....	1040.....	16
2200 (Max.)	1100.....	17

Condensers—Delco-Remy, 1837963.

Ignition Coil—Delco-Remy, 553-E. Amperage draw 4.4 (engine stopped); 2.2 (engine idling).

Ignition Switch and Cable—Delco-Remy, 435-R.

GENERATOR

D-R Test 1602 Rotation, L. H., Com. End Group 28
Delco-Remy, 933-M (Belt Drive)

NOTE:—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating-point current and voltage regulators. The regulator should be used when testing this generator. The following performance readings were taken with the voltage regulator points short circuited together, and the maximum generator output controlled by the vibrating-point current regulator.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	650.....	6.5
2.....	680.....	6.6
4.....	720.....	6.7
6.....	755.....	6.8
8.....	800.....	6.9
10.....	840.....	7.
12.....	890.....	7.1
14.....	940.....	7.2
16.....	1000.....	7.3
18.....	1060.....	7.4
20.....	1130.....	7.5
22.....	1250 (Max.)	7.6

Motoring Freely—2.7 to 3 amps. at 6 volts.

Max. Stall Current—22 to 24 amps. at 5 volts.

Field Test—1.7 to 2.0 amps. at 6 volts across field coils in series.

Brush Spring Tension—22 to 26 oz. on each (new brushes).

Armature—Delco-Remy, 1854448.

RELAY-REGULATORS

D-R Test 1419 Delco-Remy, 5818

A combination Cut-Out Relay, Vibrating Current, and Vibrating Voltage Regulators with two Field Resistance Units (D-R 1865615 inner; 1858018 outer Resistances).

Cut-Out Relay—
Closes—6.5 to 7.0 volts.
Opens—0 to 3 amps. discharge at 6.3 volts.
Contact Gap—.018 to .025 inches.
Core Gap—.018 to .022 inches, contacts closed.

Current Regulator—Contact Spring Tension — 3.5 ounces (minimum).

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.070 to .080 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Amperes Charge—24.0 to 26.0 at 70° F.

Voltage Regulator—IMPORTANT! While making voltage regulator tests short circuit current regulator with jumper across contact points.

Contact Spring Tension — 3.5 ounces (minimum).

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Circuit Voltage—This voltage regulator must be adjusted on a closed circuit only.

Voltage Setting—Regulator operates at 7.55 to 7.85 volts, with a generator charging rate of from 8 to 10 amps. (70° F.), and running between 2800 and 3400 R.P.M. Connect voltmeter between terminal marked "Ign." and ground.

Solenoid Relay—(Located in Solenoid Unit):
D-R Test 613

Closes—3.2 volts (max.).

Opens—1.6 to 2.0 volts.

Contact Gap—.030 to .045 inch.

Core Gap—.010 to .014 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 487-H.

Location—On support foot of steering column.

Horn Relay—Delco-Remy, 271-A.

Thermostatic Lighting Current Limit Relay—Delco-Remy, 411-A.

Lighting Relay—Delco-Remy, 266-T.

Foot Selector Switch—Delco-Remy, 471-T.

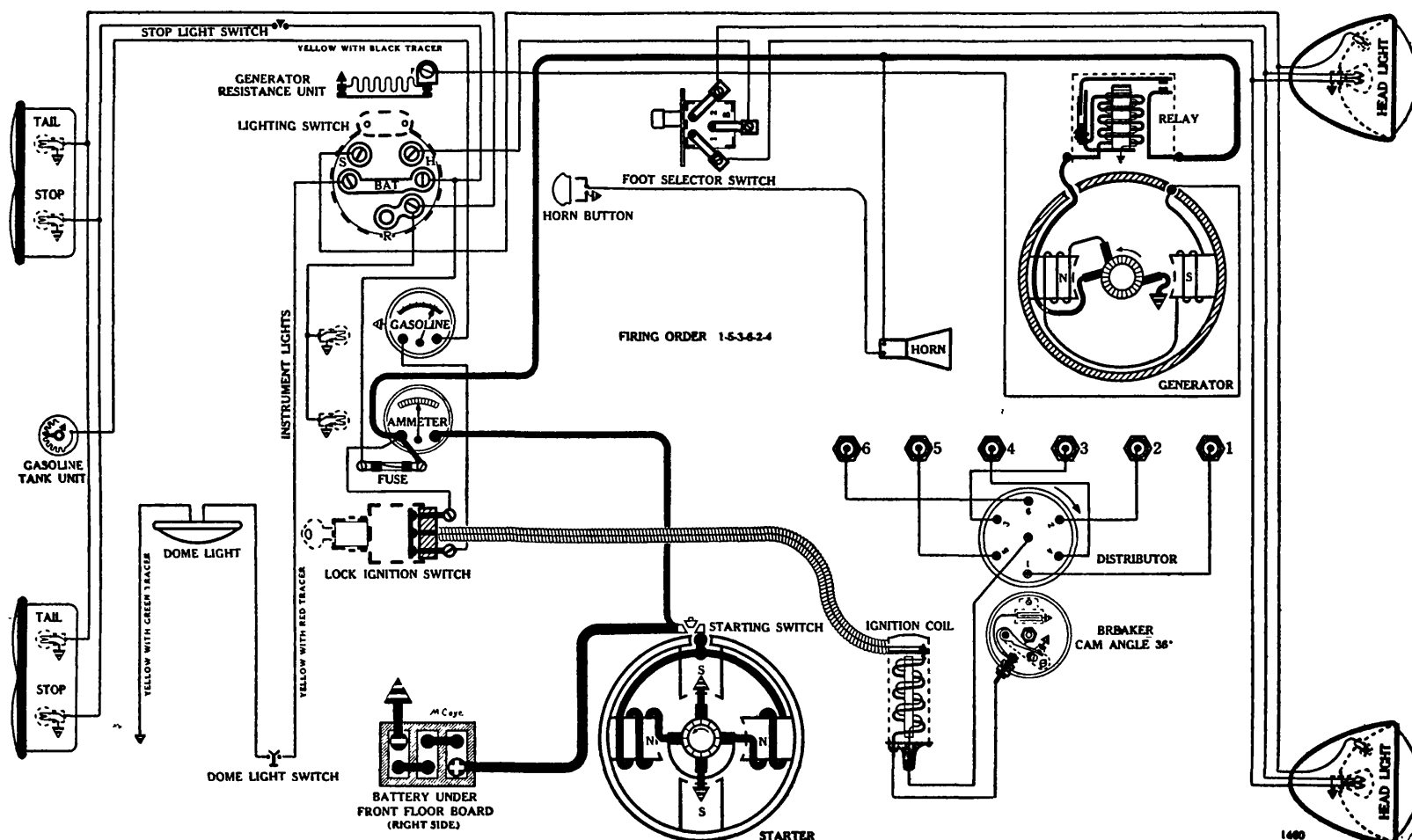
Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2330 (2530 with 32-50 C.P. filament in right head lamp when State laws permit); **PARK**—55; **MAP LIGHT**—63; **BEAM INDICATORS**—51; **INSTRUMENT**—55; **CLOCK**—51; **DOVE**—87; **LICENSE PLATE**—63; **STOP AND TAIL**—1154.

*A new type bulb with indexed base to fit special socket. Can be inserted in correct position only.

CHEVROLET

Models "Master" and "Master DeLuxe", 6 cyls., (1937)

Engine {Bor 3-1/2
Strok 3-3/4



BATTERY

Delco-Remy, 17-M, 6 volts. Negative Terminal Grounded

Starting Capacity—115 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.5.

Lighting Capacity—5.0 amps. for 20 hours (100 amp. hour).

Case—Length, 10-9/16; width, 7; height, 7-7/16 inches.

STARTER

D-R Test 368 Rotation, L. H., Com. End Group 51
Delco-Remy, 739-A

Conn ction to Engine—Bendix Drive, Type A-1718.

Number T eth on Pinion—9.

Number Teeth on Flywheel—139.

Cranking Ratio—15.44 to 1.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—150 amps. at 5.6 volts.

Engine Cranking Speed—120 R.P.M.

Stall Data (on car)—350 amps. at 4.5 volts.

Lock Torqu (for test bench use)—12 pound-feet, 475 amps., 3.6 volts.

Brush Spring T nsion—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 362941.

Starterator Vacuum Unit—Delco-Remy, 1576.

Armature—Delco-Remy, 1847432.

IGNITION

D-R Test 131 Rotation, R. H., Top View Group 84
Delco-Remy, 649-G

(Full Automatic Spark Advance in conjunction with Delco-Remy 681-F Distributor Vacuum Control, which moves the entire Distributor)

Breaker—Contact separation .018 inch.

Cam Angles—Points closed 35 degrees; open 25 degrees.

NOTE:—Diagram shows 36 degree cam angle, which was official up to June, 1937. Delco-Remy bulletin 1D-180 date 5-20-37 specifies 35 degrees.

Contact Spring Tension—17 to 21 oz.

Timing—5 degrees before top dead center. **IMPORTANT!** First set pointer on Octane Selector at zero graduation. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when steel ball, pressed into flywheel (located 5 degrees or approximately 2 flywheel teeth ahead of T.D.C.) is opposite pointer at opening in right side of flywheel housing. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open. After completion of above operations the car should be road tested, and Octane Selector set for maximum economy and performance, for the grade of fuel being used. For peak performance the Octane Selector should be set to produce a slight "ping" upon a quick acceleration, with a wide open throttle.

Spark Plugs—14-MM (AC type K-11); Gap .040 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Distributor Control (Delco-Remy 681-F; t st No. 667)—8 to 9 degrees (Dist. advance). Starts

CHEVROLET

Models "Master" and "Master Deluxe", 6 cyls., (1937)

with vacuum of $4\frac{1}{2}$ inches of mercury. Requires vacuum of from 9 to 11 inches for full travel. Total plunger travel $15\frac{1}{4}$ inch.

Vacuum Advance Table (Delco-Remy 681-F Distributor Control).

Inches of Mercury	Degrees Dist. Advance
4.5	Start
5.15	1
5.8	2
6.45	3
7.1	4
7.75	5
8.40	6
9.05	7
9.70	8
10.0	$8\frac{1}{2}$ (Max.)

Automatic Advance—25 degrees (Distributor).

NOTE:—This distributor has the most automatic advance range of any 1937 unit; 25 degrees Dist., or 50 degrees Flywheel. When plotted the curve is a "straight" line.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
500	250	Start
748	374	2
996	498	4
1244	622	6
1492	746	8
1740	870	10
1988	994	12
2236	1118	14
2484	1242	16
2732	1366	18
2980	1490	20
3228	1614	22
3476	1738	24
3600 (Max.)	1800	25

Condenser—Delco-Remy, 1861709.

Ignition Coil—Delco-Remy, 536-D. Amperage draw $4\frac{1}{2}$ (engine stopped); $2\frac{1}{2}$ (engine idling).

Primary Resistance at 70° F.—1.23 to 1.33 ohms.

Ignition Switch and Cable—Delco-Remy, 435-F.

GENERATOR

D-R Test 1250 Rotation, L. H., Com. End **Group 48**
Delco-Remy, 948-R (Belt Drive)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts
0	750	6.5
4	875	6.9
8	1000	7.2
12	1250	7.5
16	1600	7.9
20	2400 (Max)	8.2

Motoring Freely— $3\frac{1}{2}$ to 4 amps. at 6 volts.

Max. Stall Current—32 to 34 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1853593

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole the third brush may be moved. On generators of this type the third brush should be set so that it is about two commutator bars from the insulated main brush.

RELAY

D-R Test 606-A Delco-Remy, 265-G

Closes—6.75 to 7.5 volts.

Opens—0 to 2.5 amp. discharge

Contact Gap—.020 inch.

Core Gap—.015 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 485-Z (with generator field resistance).

NOTE:—This switch is so designed that by pulling knob one position the field resistance is shorted out, resulting in maximum charging, with no lights burning.

Fuses—Lighting Circuit, Single 20 amp. fuse (type 3A-20) mounted below ammeter.

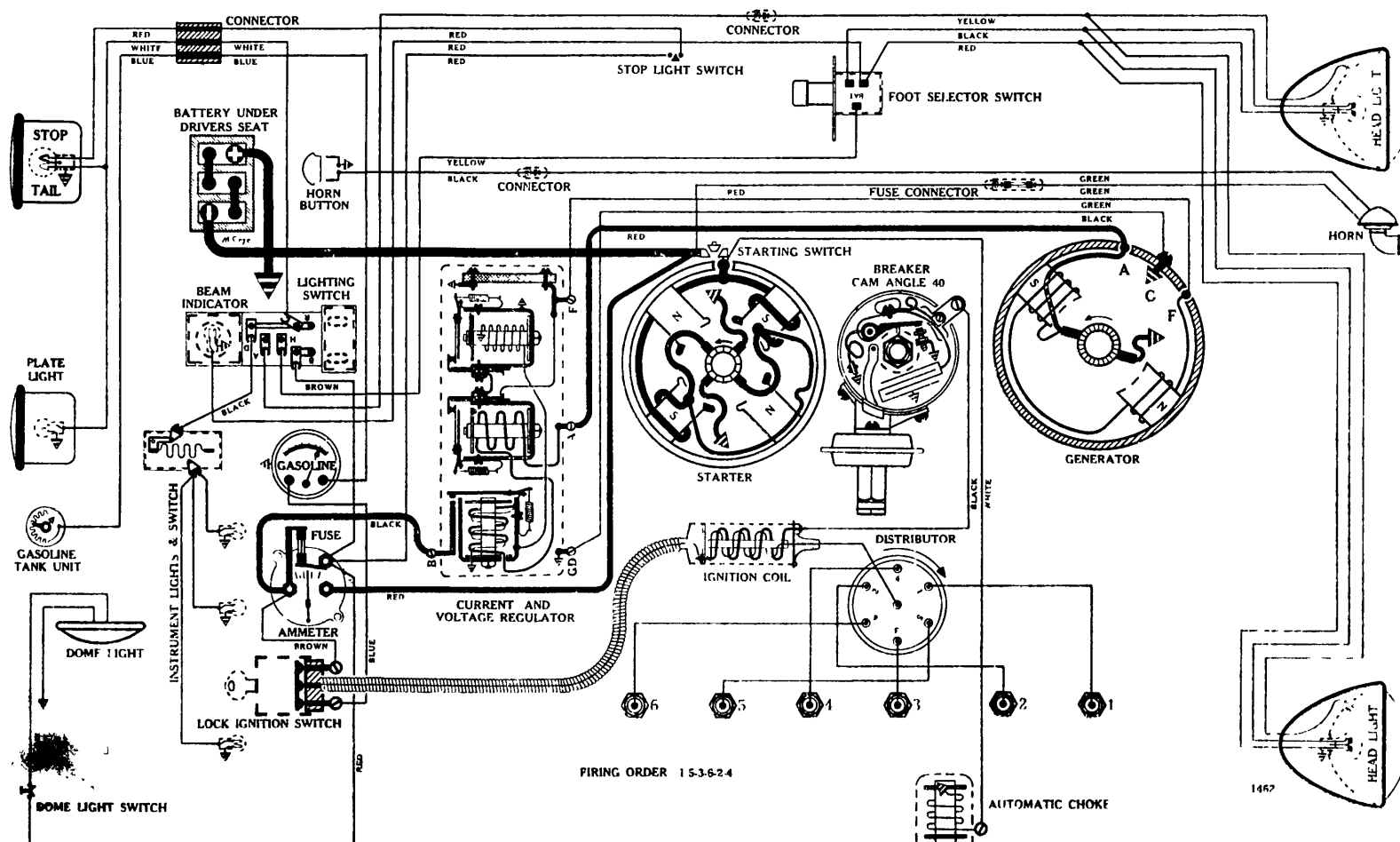
Foot Selector Switch—Delco-Remy, 471-P.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2320; PARK—55; INSTRUMENT—55;
DOME—81; STOP—63; TAIL—63.

CHRYSLER

Model C-16, "Royal" 6 cyl., (1937)

Engine { Bore 3-3/8
Stroke 4-1/4



BATTERY

Willard, WHT-2-105, 6 volts. Positive Terminal Grounded

Starting Capacity—125 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.9

Lighting Capacity—5.2 amps. for 20 hours (105 amp. hour).

Case—Length, 10-5/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

A-L Test CU-417 Rotation, L. H., Com. End
Auto-Lite, MAW-4010

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5 1/2 volts, 4900 R.P.M.

Cranking Engine—160 amps. at 5.2 volts.

Engine Cranking Speed—132 R.P.M.

Stall Data (on car)—375 amps. at 3.3 volts.

Lock Torque (for test bench use)—11 1/2 pound feet, 505 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-2813.

Armature—Auto-Lite, MAW-2030.

IGNITION

A-L Test 478 Rotation, R. H., Top View
Auto-Lite, IGS-4010-1

(Full Automatic Spark Advance in conjunction with Auto-Lite IGS-1023-DS Vacuum Chamber. This chamber controls position of Breaker Plate Assembly No. IGS-2004-B, which is stamped with the figure 10.)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 40 degrees; open 20 degrees.

Contact Spring Tension—18 to 20 oz.

Timing (Cast Iron Head)—2 degrees past top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "O" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) has moved 2 graduations past the pointer on the timing gear case cover. If timing with the MOTOR GAUGE stop when piston has moved down between .001 and .002 inches on the power stroke. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing (Aluminum Head)—Exact top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "O" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) is directly under the pointer on the timing gear-case cover. If timing with the MOTOR GAUGE stop when piston is at exact T.D.C.

Spark Plugs (Cast Iron Head)—14-MM (Champion type J-8); Gap .025 inch.

(Aluminum Head)—14-MM (Champion type H-10); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Chamber (Auto-Lite, IGS-1023-DS; Test No. 524)—10 degrees (Dist. advance). Starts with

CHRYSLER

Mod 1 C-16, "Royal" 6 cyl., (1937)

vacuum of 4.75 inches of mercury. Requires vacuum of 12 inches for full travel.

Vacuum Advance Table (Auto-Lite IGS-1023-DS Vacuum Chamber).

Inches of Mercury	Degrees Dist. Advance
4.75.....	Start
5.5	1
6.2	2
6.9	3
7.65.....	4
8.4	5
9.1	6
9.85.....	7
10.60.....	8
11.3	9
12.	10 (Max.)

Automatic Advance—13 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
700.....	350.....	Start
770.....	385.....	2
800 (Intermediate)	400.....	3
1100.....	550.....	4
1700.....	850.....	6
2300.....	1150.....	8
2900.....	1450.....	10
3500 (Max.)	1750.....	12

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CL-4602.

Ign. Coil Only—A-L, IG-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-DGS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBW-4803-A (Belt Drive)

NOTE:—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating-point current and voltage regulators. The correct model regulator should be used when testing this generator. The following performance readings were taken with the voltage regulator points short-circuited together, and the maximum generator output controlled by the vibrating-point current regulator.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	850.....	6.3
2.....	915.....	6.5
4.....	980.....	6.7
6.....	1045.....	6.9
8.....	1110.....	7.1
10.....	1175.....	7.28
12.....	1240.....	7.44
14.....	1300.....	7.61
16.....	1370.....	7.8
18.....	1435.....	8.
20.....	1500 (Max.)	8.2

Motoring Freely—2.94 to 3.26 amps. at 6 volts.

Max. Stall Current—22 to 24 amps. at 5½ volts.

Field Test—1.71 to 1.89 amps. at 6 volts.

Brush Spring Tension—23 to 27 oz. (new brushes).

Armature—Auto-Lite, GBW-2006-F.

Charging Adjustment—No third brush. External vibrating-point current and voltage regulation.

RELAY-REGULATORS

Auto-Lite VRB-4005-A with TC-51L Field Resistance Unit. Maximum current capacity 22 amperes

A combination Cut-Out Relay, Vibrating-Point Current, and Vibrating-Point Voltage Regulator. Complete instructions for testing and servicing regulators of this type, together with trouble shooting charts, will be found in the Technical Section of this Manual under the "Generator Charge Regulator" classification.

Cut-Out Relay—**Points Close**—6.5 to 7.25 volts.
Points Open—5 to 3.0 amps. discharge.

Contact Gap—.015 inch minimum (points open).

Armature Air Gap—.034 to .038 inch (points open).

Current-Regulator—**Contact Spring Tension**—24 oz.

Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).

Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).

Ampere Setting—22 amps. maximum (70° F.).

Voltage Regulator—**Contact Spring Tension**—24 oz.

Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).

Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).

Voltage Setting—7.4 to 7.9 (70° F.).

LIGHTING

Switch—Chrysler, No. 667044.

Location—Behind instrument board.

Fuses—(Lighting) single 20 amp. fuse (type 3A-20) in special bayonet type fuse holder, attached to back of ammeter. (If dual horns), 30 amp. (type 3A-30) fuse in horn relay.

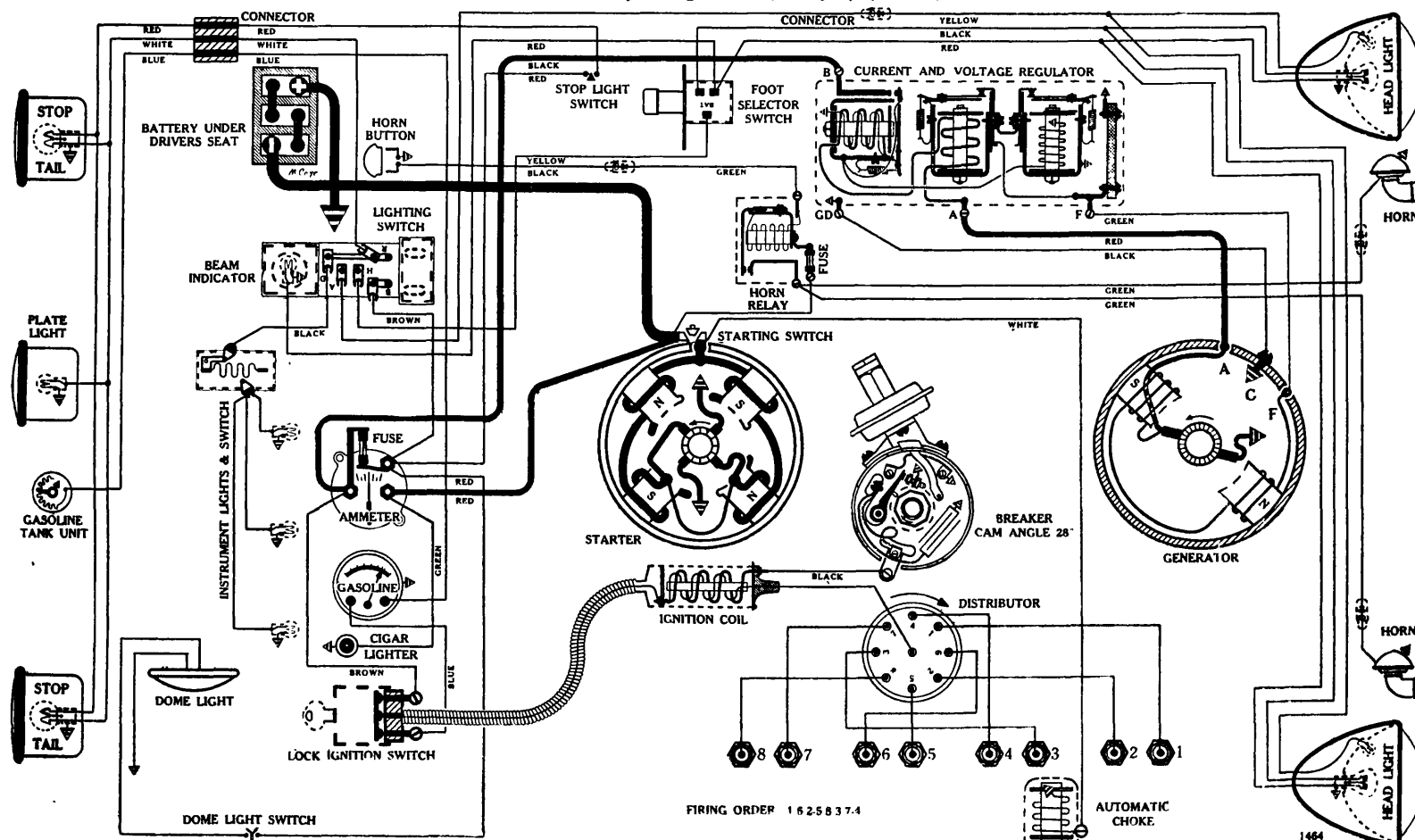
Horn Relay—Auto-Lite, HR-4002 (if used).

Foot Selector Switch—Douglas No. 5544.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2331; **PARK**—55; **INDICATOR**—51; **INSTRUMENT**—55; **DOVE**—87; **LICENSE PLATE**—63; **IGNITION LOCK**—51; **STOP AND TAIL**—1158.

CHRYSLER

Model C-14, "Imperial", 8 cyl., (1937)

Engine { Bore 3-1/4
Strok 4-1/8

BATTERY

Willard, WH-2-15, 6 volts. Positive Terminal Grounded

Starting Capacity—140 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—4.3

Lighting Capacity—5.9 amps. for 20 hours (119 amp. hour).

Case—Length, 10-5/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

A-L Test 430 Rotation, L. H., Com. End
Auto-Lite, MAX-4015

Conn ction to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5½ volts, 5300 R.P.M.

Cranking Engine —165 amps. at 4.9 volts.

Engine Cranking Speed—132 R.P.M.

Stall Data (on car)—400 amps. at 2.9 volts.

Lock Torque (for test bench use)—16½ pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—42 oz. min. to 53 oz. max. on each (new brushes).

Starting Switch—Auto-Lite, SW-2813.

Armatur —Auto-Lite, MAW-2030.

IGNITION

Rotation, R. H., Top View

(Thre diff rent Distributors used)

Auto-Lit , IGT-4001-D-1, or IGT-4001-G-1,
or IGT-4001-J-1

A-L Test 479 Auto-Lite, IGT-4001-D-1

(Full Automatic Spark Advanc in conjunction with
Auto-Lite IGT-1023-AS Vacuum Chamb r. This

chamber controls position of Breaker Plate Assembly No. IGT-1004, which is stamped with the figure 6.)

Breaker—Contact separation .016 inch.

Cam Angles—Points closed 28 degrees; open 17 degrees.

Contact Spring Tension—18 to 20 oz.

Timing—3 degrees past top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "O" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) has moved 3 graduations past the pointer on the timing gear-case cover. If timing with the MOTOR GAUGE stop when the piston has moved down .004 inch on the power stroke. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (Champion type H-10) ; Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Chamber (Auto-Lite, IGT-1023-AS; Test No. 454)—6 degrees (Dist. advance). Starts with vacuum of 5.11 inches of mercury. Requires vacuum of 12 inches for full travel.

Vacuum Advance Table (Auto-Lite, IGT-1023-AS Vacuum Chamber).

Inches of Mercury	Degrees Dist. Advance
5.10.....	Start
6.25.....	1
8.55.....	3
10.85.....	5
12.00.....	6 (Max.)

Automatic Advance—13 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
700.....	350.....	Start
770.....	385.....	2
800 (Intermediate)	400.....	3
1100.....	550.....	4
2300.....	1150.....	8
3500.....	1750.....	12
3800 (Max.)	1900.....	13

CHRYSLER

Model C-14, "Imp rial", 8 cyl., (1937)

Ign. Coil, Lock Switch and Cabl Assembly Compl te—
A-L, CE-4624.

Ign. Coil Only—A-L, CE-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L,
CE-1187-DGS.

A-L Test 526 Auto-Lite, IGT-4001-G-1

(Full Automatic Spark Advance in conjunction with Auto-Lite IGT-1023-DS Vacuum Chamber. This chamber controls position of Breaker Plate Assembly No. IGT-1004, which is stamped with the figure 6.)

NOTE:—All ignition data same as the IGT-4001-D-1 distributor with exception of the Vacuum and Automatic Spark Advance characteristics, which are as follows:

Vacuum Chamber (Auto-Lite, IGT-1023-DS; Test No. 527)—6 degrees (Dist. advance). Starts with vacuum of 5.1 inches of mercury. Requires vacuum of 14 inches for full travel.

Vacuum Advance Table (Auto-Lite, IGT-1023-DS Vacuum Chamber).

Inches of Mercury	Degrees Dist. Advance
5.10.....	Start
6.55.....	1
8.05.....	2
9.55.....	3
11.00.....	4
12.50.....	5
14.00.....	6 (Max.)

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
700.....	350.....	Start
770.....	385.....	2
800 (Intermediate)	400.....	3
1100.....	550.....	4
1700.....	850.....	6
2300.....	1150.....	8
2900 (Max.)	1450.....	10

A-L Test 418 Auto-Lite, IGT-4001-J-1

(Full Automatic Spark Advance in conjunction with Auto-Lite IGT-1023-ES Vacuum Chamber. This chamber controls position of Breaker Plate Assembly No. IGT-1004-C, which is stamped with the figure 7.)

NOTE:—All ignition data same as the IGT-4001-D-1 distributor with exception of the Vacuum and Automatic Spark Advance characteristics, which are as follows:

Vacuum Chamber (Auto-Lite, IGT-1023-ES; Test No. 532)—7 degrees (Dist. advance). Starts with vacuum of 5 inches of mercury. Requires vacuum of 12 inches for full travel.

Vacuum Advance Table (Auto-Lite, IGT-1023-ES Vacuum Chamber).

Inches of Mercury	Degrees Dist. Advance
5.	Start
6.	1
7.	2
8.	3
9.	4
10.	5
11.	6
12.	7 (Max.)

Automatic Advance—11 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
700.....	350.....	Start
770.....	385.....	2
800 (Intermediate)	400.....	3
1100.....	550.....	4
1700.....	850.....	6
2300.....	1150.....	8
2900.....	1450.....	10
3200 (Max.)	1600.....	11

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GCO-4801-C (Belt Drive)

NOTE:—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating-point current and voltage regulators. The correct model regulator should be used when testing this generator. The following performance readings were taken with the voltage regulator points short-circuited together, and the maximum generator output controlled by the vibrating-point current regulator.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	790.....	6.2
2.....	850.....	6.4
4.....	900.....	6.55
6.....	960.....	6.7
8.....	1015.....	6.9
10.....	1070.....	7.02
14.....	1175.....	7.35
16.....	1240.....	7.5
18.....	1295.....	7.7
20.....	1350.....	7.85
24.....	1465.....	8.19
26.....	1520.....	8.32
28.....	1575 (Max.)	8.5

Motoring Freely—3.85 to 4.25 amps. at 6 volts.

Max. Stall Current—30 to 34 amps. at 5 volts.

Field Test—1.47 to 1.63 amps. at 6 volts.

Brush Spring Tension—23 to 27 oz. (new brushes).

Armature—Auto-Lite, GCO-2006-F.

Charging Adjustment—No third brush. External vibrating-point current and voltage regulation.

RELAY-REGULATORS

Auto-Lite, VRB-4004-B with TC-51L Field Resistance Unit. Maximum current capacity 28 amp res

A combination Cut-Out Relay, Vibrating-Point Current, and Vibrating-Point Voltage Regulator. Complete instructions for testing and servicing regulators of this type, together with trouble shooting charts, will be found in the Technical Section of this Manual under the "Generator Charge Regulator" classification.

Cut-Out Relay— Points Close—6.5 to 7.25 volts.
Points Open—.5 to 3.0 amps. discharge.

Contact Gap—.015 inch minimum (points open).

Armature Air Gap—.034 to .038 inch (points open).

Current Regulator— Contact Spring Tension—24 oz.
Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).

Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).

Ampere Setting—28 amps. maximum (70° F.).

Voltage Regulator— Contact Spring Tension—24 oz.
Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).

Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).

Voltage Setting—7.4 to 7.9 (70° F.).

LIGHTING

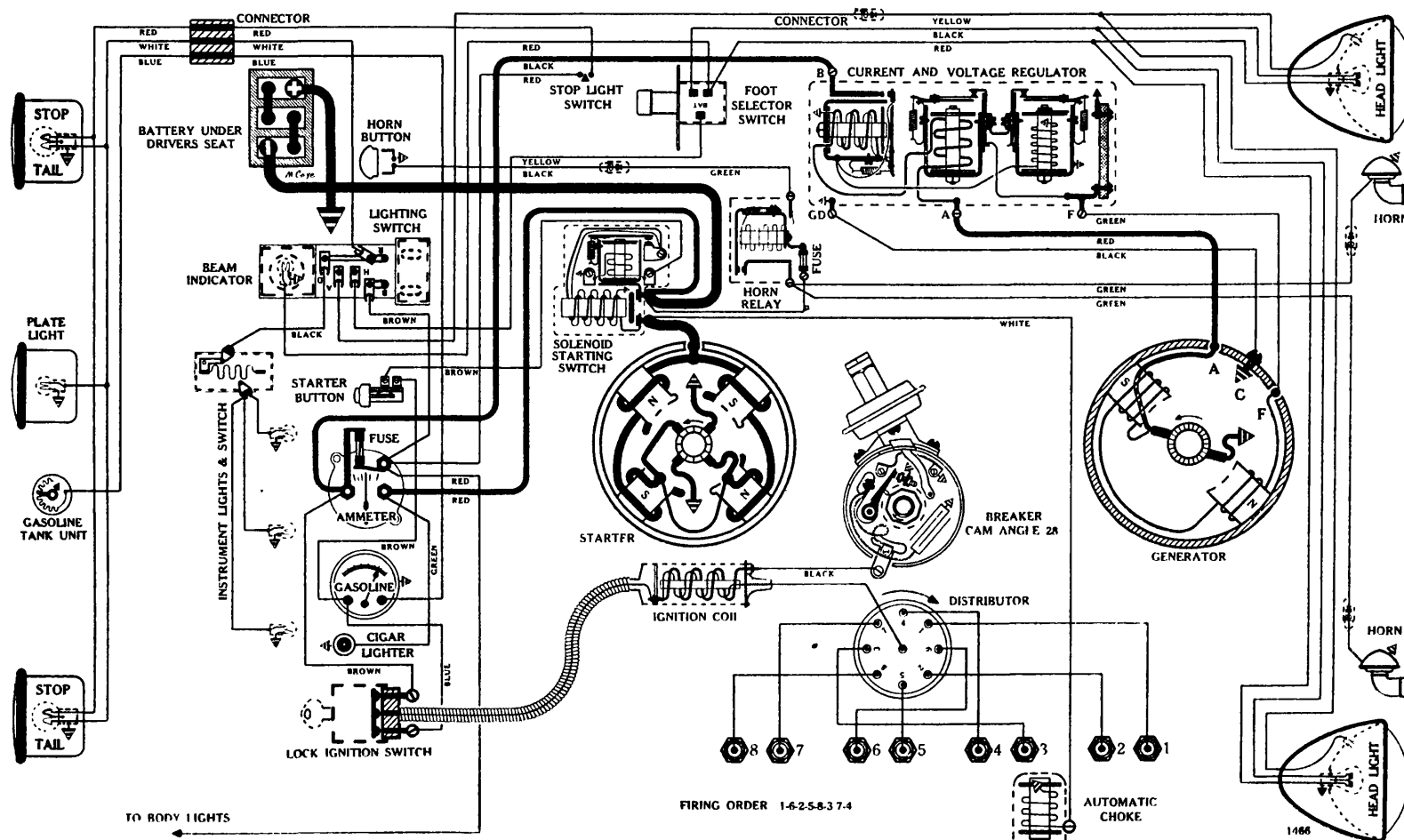
Switch—Chrysler, No. 667044.

For Data see pag 1467

CHRYSLER

Mod 1 C-15, "Custom Imperial", 8 cyl., (1937)

Engin { Bor 3-1/4
Stroke 4-7/8



BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded

Starting Capacity—160 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—5.4

Lighting Capacity—6.8 amps. for 20 hours (136 amp. hour).

Case—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

A-L Test CU-430 Rotation, L. H., Com. End
Auto-Lite, MAX-4003

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board, working in conjunction with a remote control relay (located in solenoid unit). One terminal of control relay is grounded through its case.

Start Pinion and Clutch Assembly—Auto-Lite, MAD-3099.

Running Fr —65 amps. at 5 1/2 volts, 5300 R.P.M.

Cranking Engine—175 amps. at 5.1 volts.

Engine Cranking Speed—132 R.P.M.

Stall Data (on car)—390 amps. at 3.4 volts.

Lock Torque (for test bench use)—16 1/2 pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—31 to 42 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4101.

Armature—Auto-Lite, MAW-2030.

IGNITION

A-L Test 480 Auto-Lite, IGT-4001-F-1

(Full Automatic Spark Advance in conjunction with Auto-Lite IGT-1023-AS Vacuum Chamber. This Chamber controls position of Breaker Plate Assembly No. IGT-1004, which is stamped with the figure 6.)

Breaker—Contact separation .016 inch.

Cam Angles—Points closed 28 degrees; open 17 degrees.

Contact Spring Tension—18 to 20 oz.

Timing (Cast Iron Head)—5 degrees past top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "O" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) has moved 5 graduations past the pointer on the timing gear-case cover. If timing with MOTOR GAUGE stop when the piston has moved down .012 inch on the power stroke. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (Champion type H-10); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Chamber (Auto-Lite, IGT-1023-AS; Test No. 454)—6 degrees (Dist. advance). Starts with vacuum of 5.1 inches of mercury. Requires vacuum of 12 inches for full travel.

Vacuum Advance Table (Auto-Lite, IGT-1023-AS Vacuum Chamber).

Inches of Mercury	Degrees Dist. Advance
5.10.....	Start
6.25.....	1
7.4.....	2
8.55.....	3
9.70.....	4
10.85.....	5
12.00.....	6 (Max.)

CHRYSLER

Model C-15, "Custom Imperial", 8 cyl., (1937)

Automatic Advance—11 degrees (Distributor).		
Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
700.....	350.....	Start
770.....	385.....	2
800 (Intermediate)	400.....	3
1160.....	580.....	4
1890.....	945.....	6
2610.....	1305.....	8
3340.....	1670.....	10
3700 (Max.)	1850.....	11

Ign. Coil, Lock Switch and Cable Assembly Complete—
A-L, CE-4626.

Ign. Coil Only—A-L, CE-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L,
CE-1187-DLS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GCO-4801-C (Belt Drive)

NOTE:—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating-point current and voltage regulators. The correct model regulator should be used when testing this generator. The following performance readings were taken with the voltage regulator points short-circuited together, and the maximum generator output controlled by the vibrating-point current regulator.

Performance Data—Gen. cold.		
Amps.	R.P.M.	Volts
0.....	790.....	6.2
2.....	850.....	6.4
4.....	900.....	6.55
6.....	960.....	6.7
8.....	1015.....	6.9
10.....	1070.....	7.02
12.....	1130.....	7.2
14.....	1175.....	7.35
16.....	1240.....	7.5
18.....	1295.....	7.7
20.....	1350.....	7.85
22.....	1410.....	8.
24.....	1465.....	8.19
26.....	1520.....	8.32
28.....	1575 (Max.)	8.5

Motoring Freely—3.85 to 4.25 amps. at 6 volts.

Max. Stall Current—30 to 34 amps. at 5 volts.

Field Test—1.47 to 1.63 amps. at 6 volts.

Brush Spring Tension—23 to 27 oz. (new brushes).

Armature—Auto-Lite, GCO-2006-F.

Charging Adjustment—No third brush. External vibrating-point current and voltage regulation.

RELAY-REGULATORS

Auto-Lite, VRB-4004-B with TC-51L Field Resistance

Unit. Maximum current capacity 28 amperes

A combination Cut-Out Relay, Vibrating-Point Current, and Vibrating-Point Voltage Regulator. Complete instructions for testing and servicing regulators of this type, together with trouble shooting charts, will be found in the Technical Section of this Manual under the "Generator Charge Regulator" classification.

Cut-Out Relay— Points Close—6.5 to 7.25 volts.
Points Open—.5 to 3.0 amps. discharge.
Contact Gap—.015 inch minimum (points open).
Armature Air Gap—.034 to .038 inch (points open).

Current Regulator— Contact Spring Tension—24 oz.
Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).
Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).
Ampere Setting—28 amps. maximum (70° F.).

Voltage Regulator— Contact Spring Tension—24 oz.
Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).
Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).
Voltage Setting—7.4 to 7.9 (70° F.).

LIGHTING

Switch—Chrysler, No. 667044.

Location—Behind instrument board.

Fuses—(Lighting) single 20 amp. fuse (type 3A-20) in special bayonet type fuse holder, attached to back of ammeter. (If dual horns), 30 amps. (type 3A-30) fuse in horn relay.

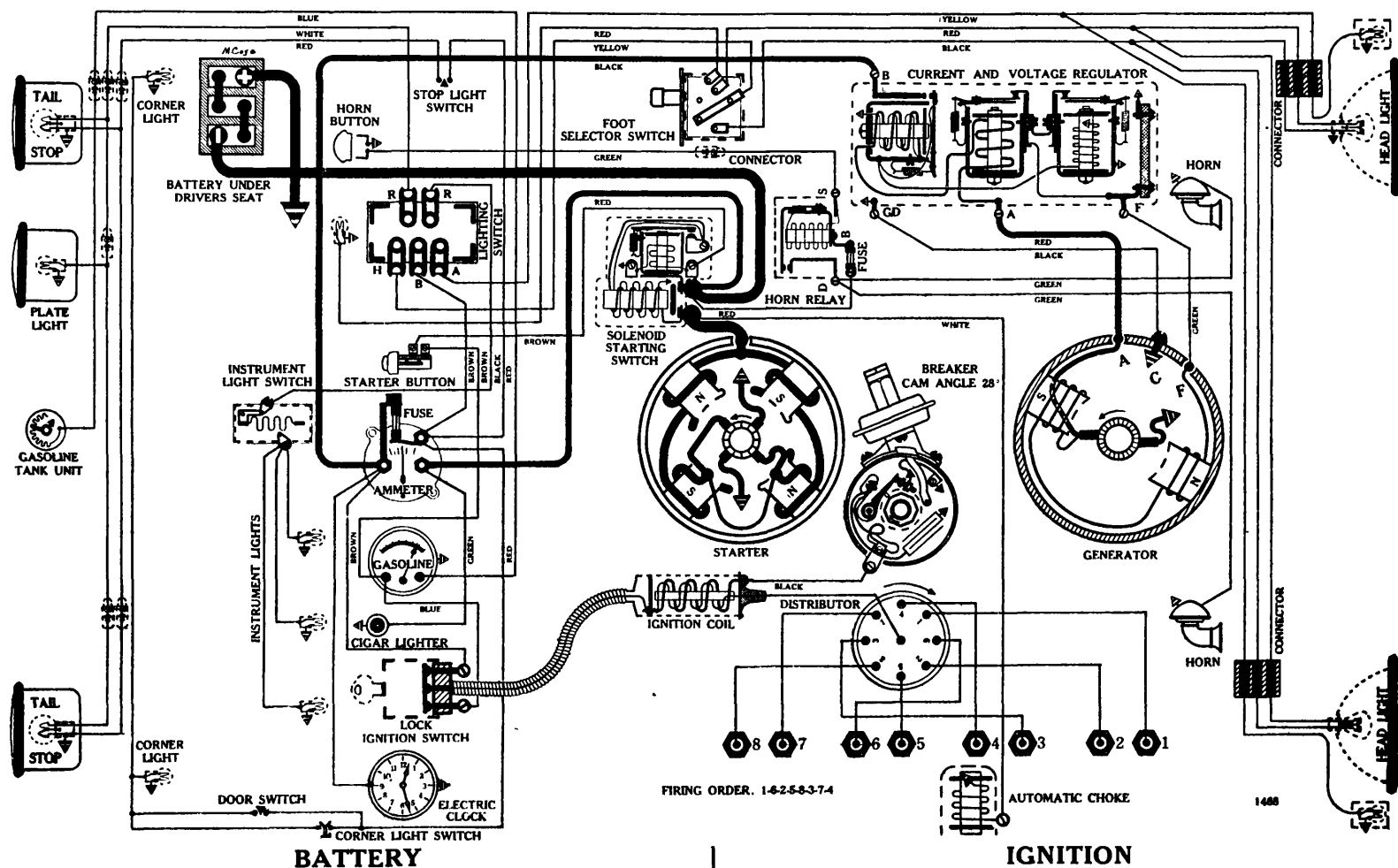
Horn Relay—Auto-Lite, HR-4002 (if used).

Foot Selector Switch—Douglas No. 5544.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2331; PARK—55; INDICATOR—51; INSTRUMENT—55; DOME—87; LICENSE PLATE—63; IGNITION LOCK—51; STOP AND TAIL—1158.

CHRYSLER

Mod 1 C-17, "Airflow", 8 cyl., (1937)

Engine { Bore 3-1/4
Stroke 4-7/8

BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded

Starting Capacity—160 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—5.4

Lighting Capacity—6.8 amps. for 20 hours (136 amp. hour).

Case—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

A-L Test CU-430 Rotation, L. H., Com. End Auto-Lite, MAX-4003

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch on the instrument board, working in conjunction with a remote control relay (located in solenoid unit). One terminal of control relay is grounded through its case.

Starter Pinion and Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5 1/2 volts, 5300 R.P.M.

Cranking Engine—175 amps. at 5.1 volts.

Engine Cranking Speed—132 R.P.M.

Stall Data (on car)—390 amps. at 3.4 volts.

Lock Torque (for test bench use)—16 1/2 pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—31 to 42 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4101.

Armature—Auto-Lite, MAW-2030.

IGNITION

A-L Test 480 Rotation, R. H., Top View Auto-Lite, IGT-4001-E-1

(Full Automatic Spark Advance in conjunction with Auto-Lite IGT-1023-AS Vacuum Chamber. This Chamber controls position of Breaker Plate Assembly No. IGT-1004, which is stamped with the figure 6.)

Breaker—Contact separation .016 inch.

Cam Angles—Points closed 28 degrees; open 17 degrees.

Contact Spring Tension—18 to 20 oz.

Timing (Cast Iron Head)—5 degrees past top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "O" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) has moved 5 graduations past the pointer on the timing gear-case cover. If timing with MOTOR GAUGE stop when the piston has moved down .012 inch on the power stroke. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (Champion type H-10); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Chamber (Auto-Lite, IGT-1023-AS; Test No. 454)—6 degrees (Dist. advance). Starts with vacuum of 5.1 inches of mercury. Requires vacuum of 12 inches for full travel.

Vacuum Advance Tabl (Auto-Lite, IGT-1023-AS Vacuum Chamber).

CHRYSLER

Mod 1 C-17, "Airflow", 8 cyl., (1937)

Inches of Mercury	Degrees Dist. Advance	
5.10.....	Start	
6.25.....	1	
7.4	2	
8.55.....	3	
9.70.....	4	
10.85.....	5	
12.00.....	6 (Max.)	
Automatic Advance—11 degrees (Distributor).		
Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
700.....	350.....	Start
770.....	385.....	2
800 (Intermediate)	400.....	3
1160.....	580.....	4
1890.....	945.....	6
2610.....	1305.....	8
3340.....	1670.....	10
3700 (Max.)	1850.....	11
Ign. Coil, Lock Switch and Cable Assembly Complete—		
A-L, CE-4618.		
Ign. Coil Only—A-L, CE-3224-S.		
Ign. Switch and Cable Assembly Less Lock—A-L,		
CE-1187-CQS.		

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GCO-4801-C (Belt Drive)

NOTE:—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating-point current and voltage regulators. The correct model regulator should be used when testing this generator. The following performance readings were taken with the voltage regulator points short-circuited together, and the maximum generator output controlled by the vibrating-point current regulator.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	790.....	6.2
2.....	850.....	6.4
4.....	900.....	6.55
6.....	960.....	6.7
8.....	1015.....	6.9
10.....	1070.....	7.02
12.....	1130.....	7.2
14.....	1175.....	7.35
16.....	1240.....	7.5
18.....	1295.....	7.7
20.....	1350.....	7.85
22.....	1410.....	8.
24.....	1465.....	8.19
26.....	1520.....	8.32
28.....	1575 (Max.)	8.5

Motoring Freely—3.85 to 4.25 amps. at 6 volts.

Max. Stall Current—30 to 34 amps. at 5 volts.

Field Test—1.47 to 1.63 amps. at 6 volts.

Brush Spring Tension—23 to 27 oz. (new brushes).

Armature—Auto-Lite, GCO-2006-F.

Charging Adjustment—No third brush. External vibrating-point current and voltage regulation.

RELAY-REGULATORS

Auto-Lite, VRB-4004-B with TC-51L Field Resistance

Unit. Maximum current capacity 28 amp res

A combination Cut-Out Relay, Vibrating-Point Current, and Vibrating-Point Voltage Regulator. Complete instructions for testing and servicing regulators of this type, together with trouble shooting charts, will be found in the Technical Section of this Manual under the "Generator Charge Regulator" classification.

Cut-Out Relay—
Points Close—6.5 to 7.25 volts.
Points Open—.5 to 3.0 amps. discharge.
Contact Gap—.015 inch minimum (points open).
Armature Air Gap—.034 to .038 inch (points open).

Current Regulator—
Contact Spring Tension—24 oz.
Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).
Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).
Ampere Setting—28 amps. maximum (70° F.).

Voltage Regulator—
Contact Spring Tension—24 oz.
Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).
Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).
Voltage Setting—7.4 to 7.9 (70° F.).

LIGHTING

Switch—Chrysler, No. 655559.

Location—Behind instrument board.

Fuses—(Lighting) single 20 amp. fuse (type 3A-20) in special bayonet type fuse holder, attached to back of ammeter. (Horns), 30 amps. (type 3A-30) fuse in horn relay.

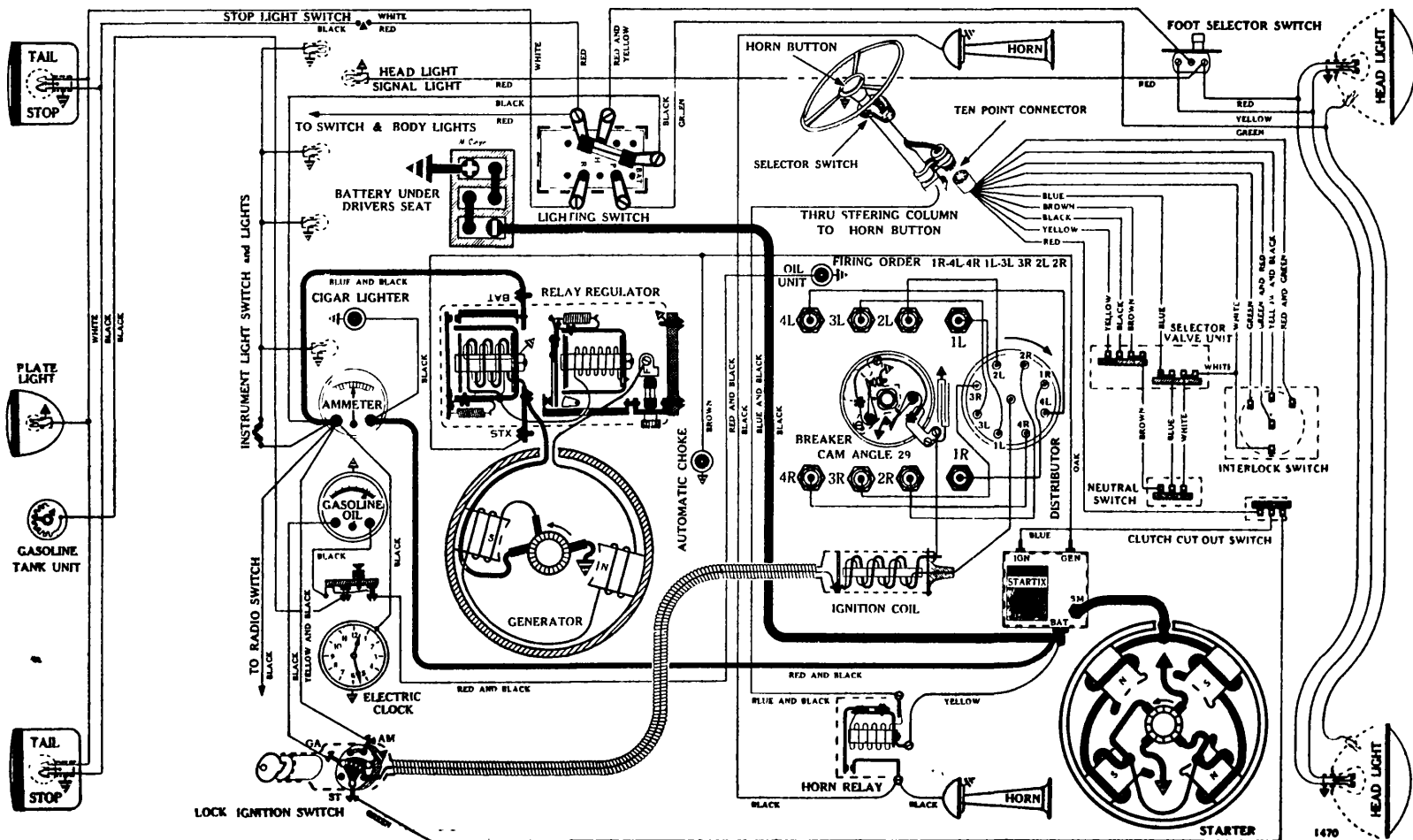
Foot Selector Switch—Clum, No. 9657.

Lamps—Refer to "Lamp Data" in Technical Section.
 HEAD—2331; PARK—55; INDICATOR—51;
 INSTRUMENT—55; READING—87; LICENSE
 PLATE—63; IGNITION LOCK—51; STOP AND
 TAIL—1158.

CORD

Engin { Bore 3-1/2
Stroke 3-3/4

S ries 812, "Supercharged", 90 Degree "Vee" 8, (1937)



BATTERY

U.S.L., FN-19-F, 6 volts. Positive Terminal Grounded

Starting Capacity—135 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.9
Lighting Capacity—5.4 amps. for 20 hours (108 amp. hour).
Case—Length, 11-11/16; width, 7 1/4; height, 7 3/8 inches.

STARTER

A-L Test CU-430 Rotation, L. H., Com. End
Auto-Lite, MAX-4021

Connection to Engine—Bendix Drive, Type A-1729.
Running Free—65 amps. at 5 1/2 volts, 5300 R.P.M.
Cranking Engine—140 amps. at 5.3 volts.
Engine Cranking Speed—102 R.P.M.
Stall Data (on car)—300 amps. at 3.5 volts.
Lock Torque (for test bench use)—16 1/2 pound-feet, 640 amps. at 3 volts.
Brush Spring Tension—42 to 53 oz. on each (new brushes).
Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.
Armature —Auto-Lite, MAW-2006.

IGNITION

A-L Test 396 Rotation, R. H., Top View
Auto-Lite, IGH-4028

Breakers—Contact separation .020 in
Cam Angles—Points closed 34 degrees (each breaker separately).

closed 34 degrees; open 11 degrees (with both breakers operating).

Contact Spring Tension—18 to 20 oz. on each.
Synchronizing—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.

Timing—2 degrees before top dead center. Slowly turn engine until No. 4L piston is coming up on compression stroke. Stop when flywheel mark "4L" is in line with pointer on flywheel housing. Turn engine backwards almost one complete flywheel tooth (2 degrees). Set distributor so stationary set of breaker points are just opening.

Spark Plugs—14-MM (Champion type H-10); Gap .028 inch.

Firing Order—4L-4R-1L-3L-3R-2L-2R-1R.

Automatic Advance—9 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600.....	300.....	Start
934.....	467.....	1
1268.....	634.....	2
1600.....	800.....	3
1934.....	967.....	4
2268.....	1134.....	5
2600.....	1300.....	6
2934.....	1467.....	7
3268.....	1634.....	8
3600 (Max.).....	1800.....	9

ite, IGB-1025-C. Capacity .20 to .25

and Cab Assembly Complete —

— A-L, CE-3224-S.

Switch on Cab Assembly Less Lock—A-L, 107-CRS.

g... Co.

CORD

Series 812, "Supercharged", 90 Degree "Vee" 8, (1937)

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBR-4603-4 (Belt Drive)

Performance Data—Gen. cold. Field lead grounded to generator.

Amps.	R.P.M.	Volts
0.....	800.....	6.5
4.....	950.....	6.8
8.....	1090.....	7.1
10.....	1175.....	7.3
12.....	1250.....	7.5
16.....	1480.....	7.8
20.....	1900.....	8.1
22.....	2200 (Max.)	8.2

Running Free—5.8 to 6.4 amps. at 6 volts.

Max. Stall Current—26 to 28 amps. at 6 volts.

Field Test—4.1 to 4.5 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5), in regulator unit.

Brush Spring Tension—36 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAR-2116.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite, TC-4306-A with TC-51 Field Resistance Unit

A combination Cut-Out Relay and Voltage Operated Two-Stage Charge Regulator

Cut-Out Relay —	Closes —6.5 to 7.25 volts.
	Opens —.5 to 2.5 amps. discharge.
	Contact Gap —.025 to .035 inch.
	Core Gap —.010 to .030 inch, contacts closed.
Regulator—	Contact Spring Tension —10 to 12 oz.
A-L Test 119	Points Open —8.25 volts (70° F.).
	Points Close —7.0 volts.
	Contact Opening —.005 inch (minimum).
	Core Gap —.020 inch (contacts closed).

For adjustments at other temperatures see complete data in Technical Section.

LIGHTING

Switch—Soreng-Manegold, No. A-5640-A.

Location—Behind instrument board. Operated by lever on instrument board.

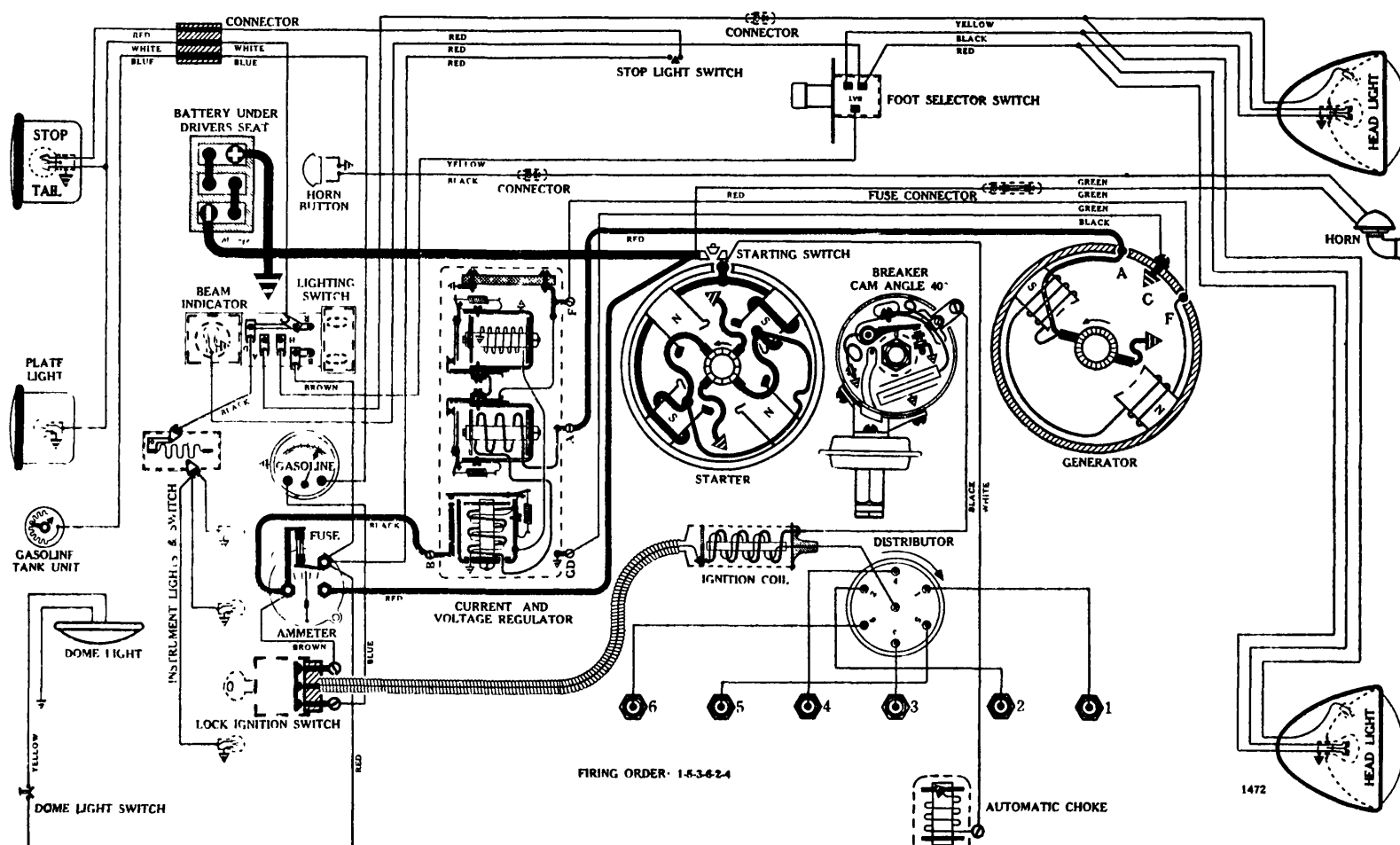
Fuses—Single 20 amp. fuse (type 3A-20), mounted on switch. Spare fuse in clip on switch support.

Foot Selector Switch—Delco-Remy, 465-W.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2331; PARK—55; INSTRUMENT—63;
INDICATOR—55; CORNER—81; LICENSE PLATE—63; STOP AND TAIL—1158.

DE SOTO

Mod 1 S-3, 6 cyl., (1937)

 Engin { Bore 3-3/8
 Strok 4-1/4


BATTERY

Willard, WHT-2-105, 6 volts. Positive Terminal Grounded

Starting Capacity—125 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.9

Lighting Capacity—5.2 amps. for 20 hours (105 amp. hour).

Case—Length, 10-5/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

A-L Test CU-417 Rotation, L. H., Com. End
 Auto-Lite, MAW-4010

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5½ volts, 4900 R.P.M.

Cranking Engine —160 amps. at 5.2 volts.

Engine Cranking Speed—132 R.P.M.

Stall Data (on car)—375 amps. at 3.3 volts.

Lock Torqu (for t st b nch use)—11½ pound feet, 505 amps. at 3 volts.

Brush Spring T nsion—42 to 53 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-2813.

Armature—Auto-Lite, MAW-2030.

IGNITION

A-L Test 478 Rotation, R. H., Top View
 Auto-Lite, IGS-4010-1

(Full Automatic Spark Advance in conjunction with Auto-Lite IGS-1023-DS Vacuum Chamber. This chamber controls position of Breaker Plate Assembly No. IGS-2004-B, which is stamped with the figure 10.)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 40 degrees; open 20 degrees.

Contact Spring Tension—18 to 20 oz.

Timing (Cast Iron Head)—2 degrees past top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "O" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) has moved 2 graduations past the pointer on the timing gear case cover. If timing with the MOTOR GAUGE stop when piston has moved down between .001 and .002 inches on the power stroke. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Timing (Aluminum Head)—Exact top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "O" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) is directly under the pointer on the timing gear-case cover. If timing with the MOTOR GAUGE stop when piston is at exact T.D.C.

Spark Plugs (Cast Iron H ad)—14-MM (Champion type J-8); Gap .025 inch.

(Aluminum H ad)—14-MM (Champion type H-10); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Chamb r (Auto-Lite, IGS-1023-DS; T st No. 524)—10 degrees (Dist. advance). Starts with

DE SOTO

Mod 1 S-3, 6 cyl., (1937)

vacuum of 4.75 inches of mercury. Requires vacuum of 12 inches for full travel.

Vacuum Advance Table (Auto-Lite IGS-1023-DS Vacuum Chamber).

Inches of Mercury	Degrees Dist. Advance
4.75.....	Start
5.5	1
6.2	2
6.9	3
7.65.....	4
8.4	5
9.1	6
9.85.....	7
10.60.....	8
11.3	9
12.	10 (Max.)

Automatic Advance—13 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
700.....	350.....	Start
770.....	385.....	2
800 (Intermediate)	400.....	3
1100.....	550.....	4
1700.....	850.....	6
2300.....	1150.....	8
2900.....	1450.....	10
3500 (Max.)	1750.....	12

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CL-4602.

Ign. Coil Only—A-L, IG-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-DGS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBW-4803-A (Belt Drive)

NOTE:—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating-point current and voltage regulators. The correct model regulator should be used when testing this generator. The following performance readings were taken with the voltage regulator points short-circuited together, and the maximum generator output controlled by the vibrating-point current regulator.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	850.....	6.3
2.....	915.....	6.5
4.....	980.....	6.7
6.....	1045.....	6.9
8.....	1110.....	7.1
10.....	1175.....	7.28
12.....	1240.....	7.44
14.....	1300.....	7.61
16.....	1370.....	7.8
18.....	1435.....	8.
20.....	1500 (Max.)	8.2

Motoring Freely—2.94 to 3.26 amps. at 6 volts.

Max. Stall Current—22 to 24 amps. at 5½ volts.

Field Test—1.71 to 1.89 amps. at 6 volts.

Brush Spring Tension—23 to 27 oz. (new brushes).

Armature—Auto-Lite, GBW-2006-F.

Charging Adjustment—No third brush. External vibrating-point current and voltage regulation.

RELAY-REGULATORS

Auto-Lite VRB-4005-A with TC-51L Field Resistance Unit. Maximum current capacity 22 amperes

A combination Cut-Out Relay, Vibrating-Point Current, and Vibrating-Point Voltage Regulator. Complete instructions for testing and servicing regulators of this type, together with trouble shooting charts, will be found in the Technical Section of this Manual under the "Generator Charge Regulator" classification.

Cut-Out Relay—Points Close—6.5 to 7.25 volts.
Points Open—.5 to 3.0 amps. discharge.

Contact Gap—.015 inch minimum (points open).

Armature Air Gap—.034 to .038 inch (points open).

Current-Regulator—Contact Spring Tension—24 oz.

Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).

Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).

Ampere Setting—22 amps. maximum (70° F.).

Voltage Regulator—Contact Spring Tension—24 oz.

Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).

Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).

Voltage Setting—7.4 to 7.9 (70° F.).

LIGHTING

Switch—Chrysler, No. 667044.

Location—Behind instrument board.

Fuses—(Lighting) single 20 amp. fuse (type 3A-20) in special bayonet type fuse holder, attached to back of ammeter. (If dual horns), 30 amp. (type 3A-30) fuse in horn relay.

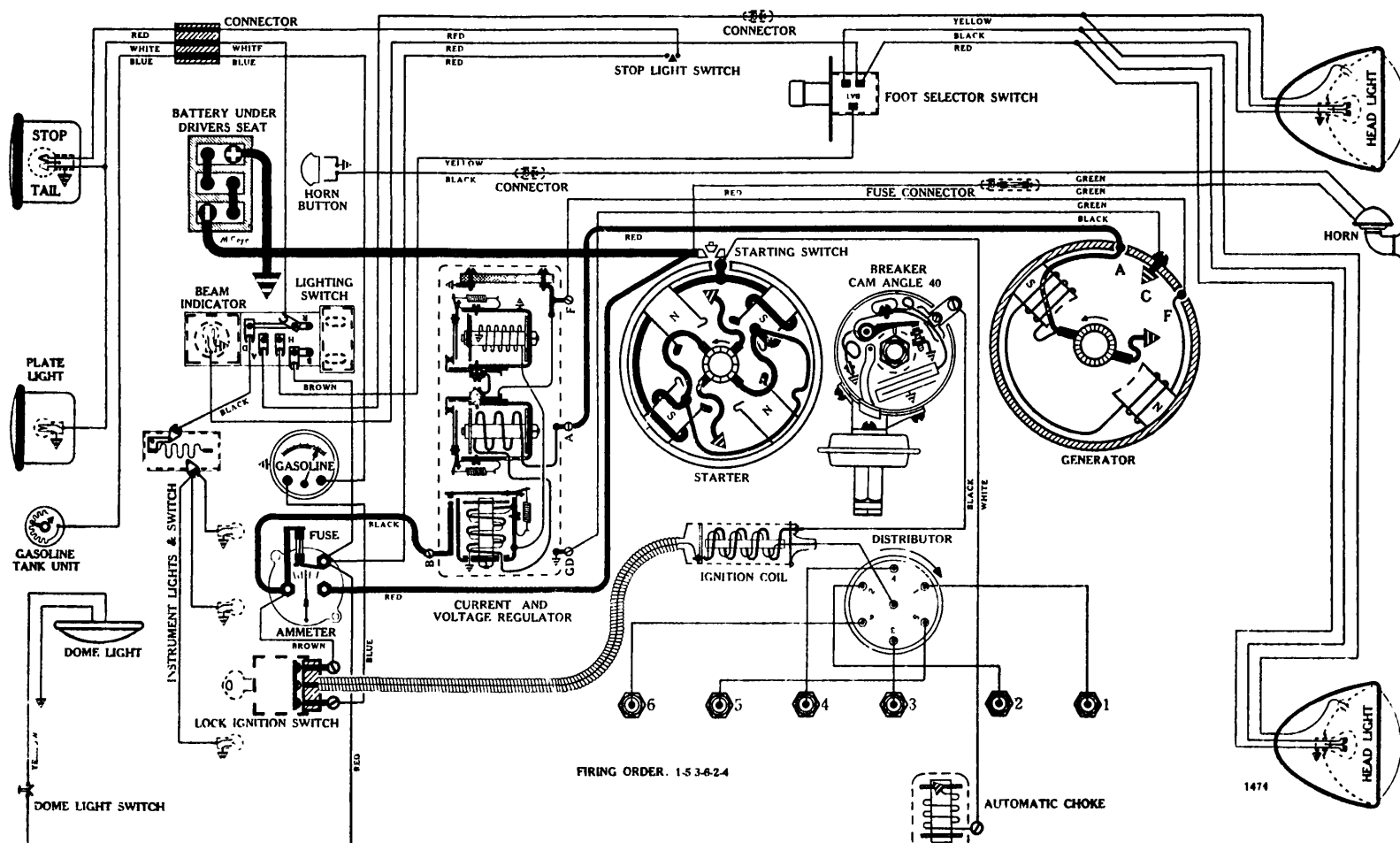
Horn Relay—Auto-Lite, HR-4002 (if used).

Foot Selector Switch—Douglas No. 5544.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2331; PARK—55; INDICATOR—51; INSTRUMENT—55; DOME—87; LICENSE PLATE—63; IGNITION LOCK—51; STOP AND TAIL—1158.

DODGE

Model D-5, 6 cyl., (1937)

Engine {Bor 3-1/4
Stroke 4-3/8**BATTERY**

Willard, WT-1-95, 6 volts. Positive Terminal Grounded

Starting Capacity—119 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1
Lighting Capacity—4.75 amps. for 20 hours (95 amp. hour).
Case—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

A-L Test CU-417 Rotation, L. H., Com. End
 Auto-Lite, MAW-4010

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5 1/2 volts, 4900 R.P.M.

Cranking Engine—160 amps. at 5.2 volts.

Engine Cranking Speed—132 R.P.M.

Stall Data (on car)—375 amps. at 3.3 volts.

Lock Torque (for test bench use)—11 1/2 pound-feet, 505 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-2813.

Armature—Auto-Lite, MAW-2030.

IGNITION

A-L Test 478 Rotation, R. H., Top View
 Auto-Lite, IGS-4002-A-1

(Full Automatic Spark Advance in conjunction with Auto-Lite IGS-1023-S Vacuum Chamber. This chamber controls position of Breaker Plate Assembly No. IGS-2004-A, which is stamped with the figure 8.)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 40 degrees; open 20 degrees.

Contact Spring Tension—18 to 20 oz.

Timing—4 degrees or .007 inch piston travel past top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the "O" mark on CRANKSHAFT IMPULSE NEUTRALIZER (which is exact T.D.C.) has moved 4 graduations past the pointer on the timing gear-case cover. If timing with MOTOR GAUGE stop when piston has moved down .007 inch on the power stroke. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (Champion type J-8); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Chamber (Auto-Lite IGS-1023-S; test No. 452)—8 degrees (Dist. advance). Starts with vacuum of 4.9 inches of mercury. Requires vacuum of 12 inches for full travel.

Vacuum Advance Tabl (Auto-Lite, IGS-1023-S Vacuum Chamber).

DODGE

Model D-5, 6 cyl., (1937)

Inches of Mercury	Degrees Dist. Advance
4.9	Start
5.8	1
6.7	2
7.55	3
8.45	4
9.35	5
10.20	6
11.10	7
12.	8 (Max.)
Automatic Advance—12 degrees (Distributor).	
Eng. R.P.M.	Dist. R.P.M. Degrees Advance (Dist.)
700	350
770	385
800 (Intermediate)	400
1100	550
1700	850
2300	1150
2900	1450
3500 (Max.)	1750
Ign. Coil, Lock Switch and Cable Assembly Complete—	
A-L, IG-4641 or CL-4601.	
Ign. Coil Only—A-L, IG-3224-S or CL-3224-S.	
Ign. Switch and Cable Assembly Less Lock—A-L,	
CE-1187-DES.	

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBW-4803-A (Belt Drive)

NOTE:—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating-point current and voltage regulators. The correct model regulator should be used when testing this generator. The following performance readings were taken with the voltage regulator points short-circuited together, and the maximum generator output controlled by the vibrating-point current regulator.

Performance Data—Gen. cold.		
Amps.	R.P.M.	Volts
0	850	6.3
2	915	6.5
4	980	6.7
6	1045	6.9
8	1110	7.1
10	1175	7.28
12	1240	7.44
14	1300	7.61
16	1370	7.8
18	1435	8.
20	1500 (Max.)	8.2

Motoring Freely—2.94 to 3.26 amps. at 6 volts.

Max. Stall Current—22 to 24 amps. at 5½ volts.

Field Test—1.71 to 1.89 amps. at 6 volts.

Brush Spring Tension—23 to 27 oz. (new brushes).

Armature—Auto-Lite, GBW-2006-F.

Charging Adjustment—No third brush. External vibrating-point current and voltage regulation.

RELAY-REGULATORS

Auto-Lite VRB-4005-A with TC-51L Field Resistance

Unit. Maximum current capacity 22 amperes

A combination Cut-Out Relay, Vibrating-Point Current, and Vibrating-Point Voltage Regulator. Complete instructions for testing and servicing regulators of this type, together with trouble shooting charts, will be found in the Technical Section of this Manual under the "Generator Charge Regulator" classification.

Cut-Out Relay— Points Close—6.5 to 7.25 volts.
Points Open—.5 to 3.0 amps. discharge.
Contact Gap—.015 inch minimum (points open).
Armature Air Gap—.034 to .038 inch (points open).

Current Regulator— Contact Spring Tension—24 oz.
Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).
Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).
Ampere Setting—22 amps. maximum (70° F.).

Voltage Regulator— Contact Spring Tension—24 oz.
Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).
Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).
Voltage Setting—7.4 to 7.9 (70° F.).

LIGHTING

Switch—Chrysler, No. 667044.

Location—Behind instrument board.

Fuses—(Lighting) single 20 amp. fuse (type 3A-20) in special bayonet type fuse holder, attached to back of ammeter. (If dual horns), 30 amp. (type 3A-30) fuse in horn relay.

Horn Relay—Auto-Lite, HR-4002 (if used).

Foot Selector Switch—Douglas No. 5544.

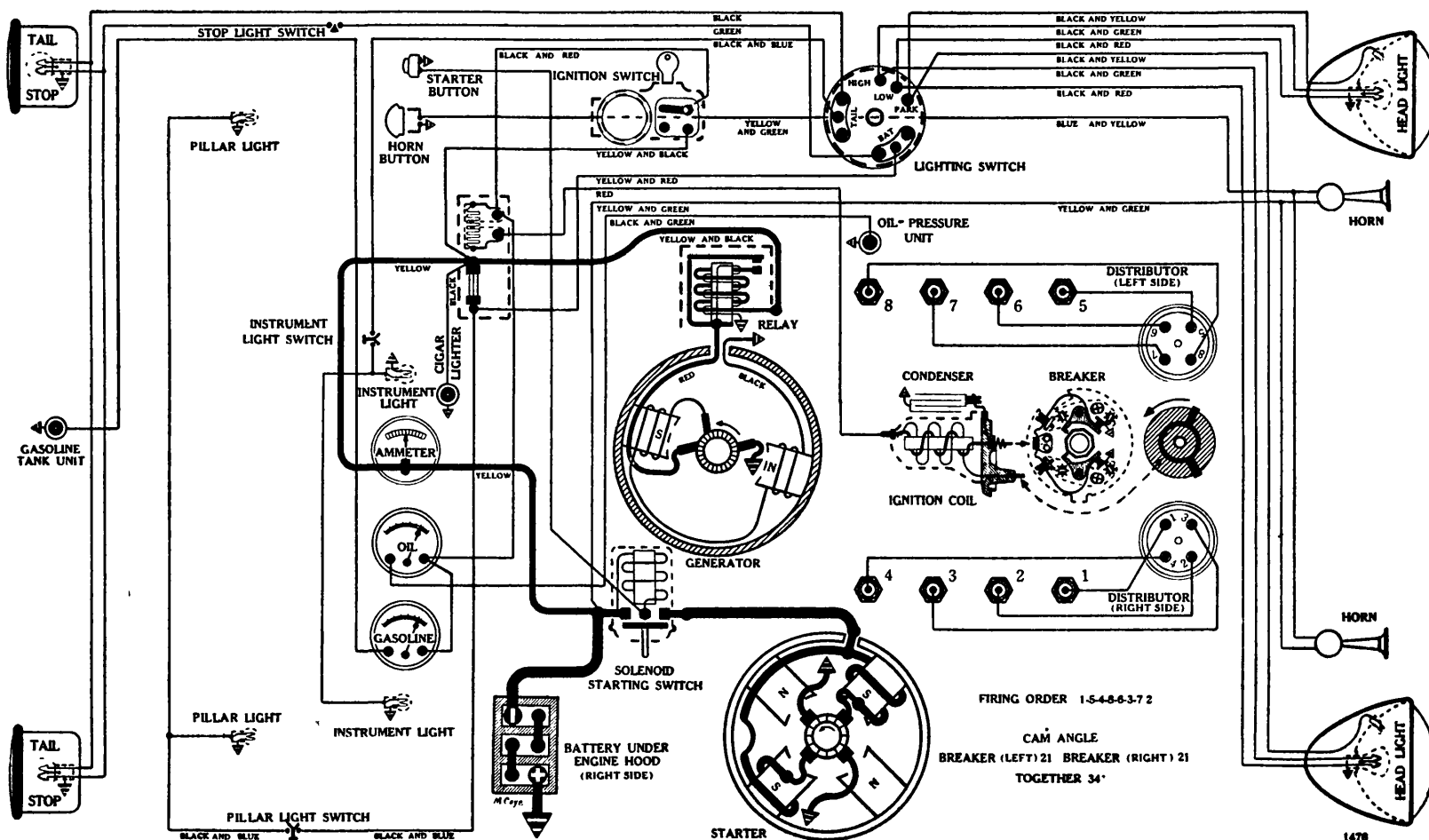
Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2331; PARK—55; INDICATOR—51; INSTRUMENT—55; DOME—87; LICENSE PLATE—63; IGNITION LOCK—51; STOP AND TAIL—1158.

85 H.P. Engine {Bor 3.062
Strok 3.75

FORD

60 H.P. Engine {Bore 2.6
Stroke 3.2

Mod ls 74 (60 H.P.) and 78 (85 H.P.), 90 Degree "Vee" Eights, (1937)



BATTERY

Ford, 78-10655-A, 6 volts (17 plate). Positive Terminal Grounded

Starting Capacity—122 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.5.

Lighting Capacity—5 amps. for 20 hours (100 amp. hour).

Case—Length, 10½; width, 7¼; height, 8¼ inches.

STARTERS

Rotation, L. H., Com. End

60 H.P., Ford 52-11002; 85 H.P., Ford 18-11002

Connection to Engine—(60 H.P.) Bendix Drive, Type A-1806; (85 H.P.) Bendix Drive, Type L11FX-10.

Number Teeth on Pinion—(60 H.P.) 9; (85 H.P.) 10.

Number Teeth on Flywheel—(60 H.P.) 122; (85 H.P.) 112.

Cranking Ratio—(60 H.P.) 13.6 to 1; (85 H.P.) 11.2 to 1.

Running Free—35 to 40 amps. at 66 volts, 3960 R.P.M.

Cranking Engine—135 to 150 amps. at 5 to 4.8 volts.

Engine Cranking Speed—100 R.P.M.

Stall Data (on car)—350 amps. at 4.1 volts.

Lock Torque (for test bench use)—14 pound-feet, 500 amps. at 3 volts.

Brush Spring Tension—32 to 36 oz. on each (new brushes).

Solenoid Starting Switch—Ford, 78-11450.

Push Button Starting Switch—Ford, 78-11500.

Armature —(60 H.P.) Ford, 52-11005; (85 H.P.) Ford, 18-11005.

IGNITION

Rotation, L. H., Viewed from Front
Ford-Mallory, Type 78-12127

Breakers—Contact separation .015 inch on each.

Cam Angles—Points closed 22 degrees; open 23 degrees (left breaker). Points closed 22 degrees; open 23 degrees (right breaker). Points closed 34 degrees; open 11 degrees (both breakers operating).

Contact Spring Tension—20 to 24 oz. on each.

Timing—Construction of ignition drive assembly makes it impossible to attach unit to engine other than in correct position. Provision is made for a slight variation in spark timing by moving small 3/16 inch slotted cap screw (found on right side of ignition housing between mounting flange and right distributor cap) up, to increase spark advance, and down to retard. With screw in center of slot, engine will have an initial spark advance of 4 flywheel degrees which, theoretically, is the correct timing position.

Spark Plugs—(60 H.P.) 14-MM (Champion type H-10); Gap .025 inch. (85 H.P.) 18-MM (Champion type 7); Gap .025 inch.

Firing Order—1-5-4-8-6-3-7-2.

Automatic Advance—8 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400	200	Start
600	300	2
1170	585	4
1220	610	5
1440	720	6
1900 (Max.)	950	8

Resistance of Primary Circuit—1 to 1-1/3 ohms.

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301455.

FORD

Models 74 (60 H.P.) and 78 (85 H.P.), 90 D gre "Ve " Eights, (1937)

GENERATORS

Rotation, L. H., Com. End

60 H.P., Ford BB-10,000-D;

85 H.P., Ford 40-10,000-B (Belt Drive)

IMPORTANT: Performance data was derived with a load on the battery equal to the generator charging rate at any given time.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0	650	6.3
2	725	6.35
4	800	6.4
6	900	6.45
8	1000	6.5
10	1150	6.55
12	1300	6.6
14	1500	6.65
16	1800	6.7
18	2800 (Max.)	6.75

Motoring Freely—6 amps. at 6 volts.

Max. Stall Current—25 amps. at 5 volts.

Field Test—4½ to 5 amps. at 6 volts across field coils in series.

Brush Spring Tension—24 to 28 oz. on main; 20 to 24 oz. on third.

Armature Speed—1.2 times engine speed.

Armature—(60 H.P.) Ford BB-10,005-A; (85 H.P.) Ford 18-10,005-A.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Ford, Type B-10505

Closes—6½ to 7 volts.

Opens—0 to 2½ amps. discharge.

Contact Gap—.015 to .020 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch and Wire Assembly—Ford, Type 78-11450.

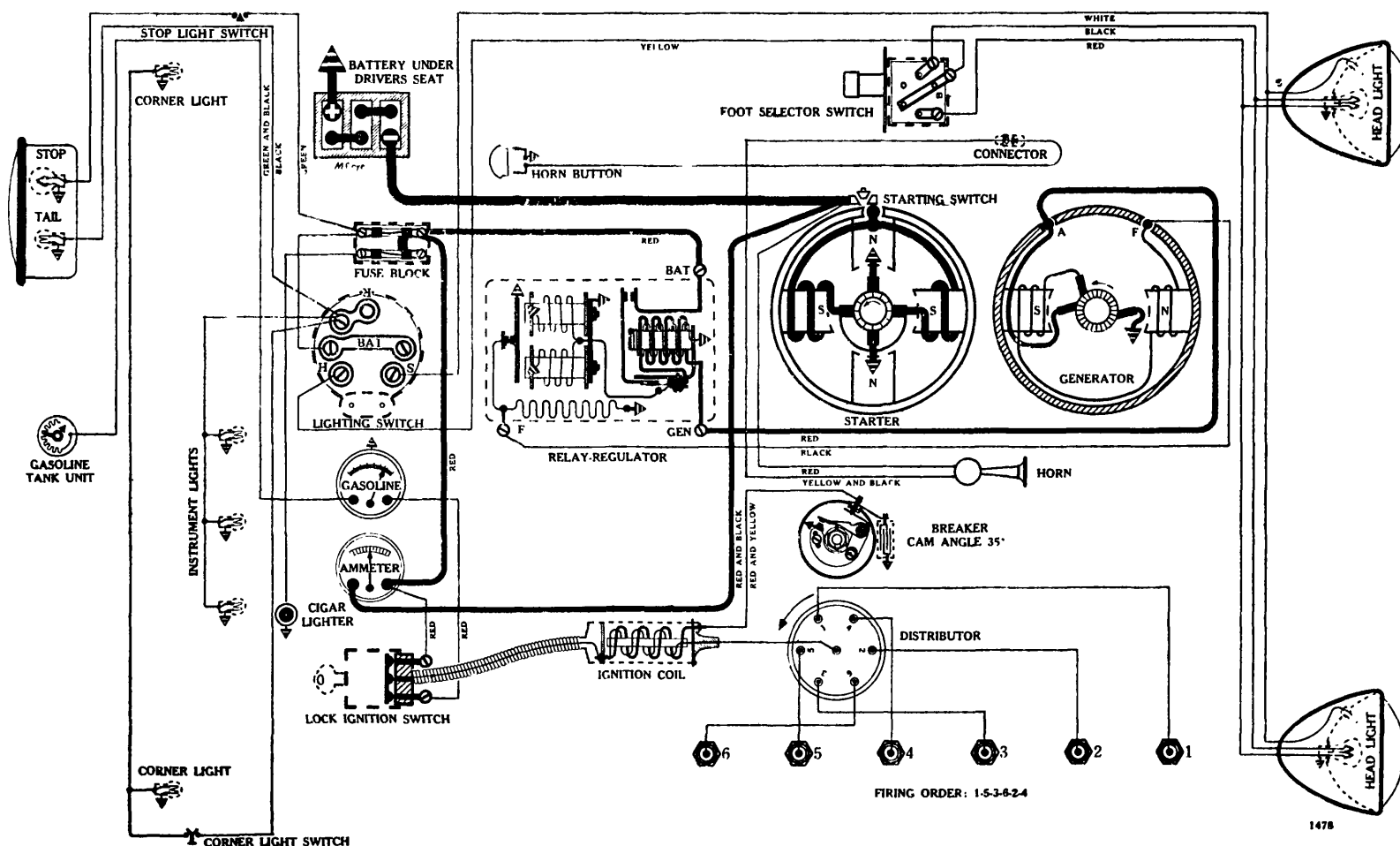
Location—Foot of steering column. Lights controlled by lever on steering wheel. Wires soldered to terminals.

Fuses—Single 20 amp. fuse (type 3A-20), mounted on dash, behind instrument board.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2330; PARK—55; INSTRUMENT—63;
PILLAR—63; STOP AND TAIL—1158.

GRAHAM

S ries 85, "Crusader" 6 cyl., (1937)

Engine { Bore 3
Strok 4

BATTERY

Willard, WHT-1-90, 6 volts. Positive Terminal Grounded

Starting Capacity—114 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.

Lighting Capacity—4.5 amps. for 20 hours (90 amp. hour).

Case—Length, 9-1/16; width, 7-1/16; height, 8-7/8 inches.

STARTER

D-R T at 368 Rotation, L. H., Com. End **Group 46**
Delco-Remy, 738-V

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—140 amps. at 5.1 volts.

Engine Cranking Speed—132 R.P.M.

Stall Data (on car)—350 amps. at 3.8 volts.

Lock Torque (for test bench use)—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test 105 Rotation, L. H., Top View **Group 82**
Delco-Remy, 623-A

(Full Automatic Spark Advance in conjunction with Delco-Remy 680-N Distributor Vacuum Control, which moves the entire Distributor).

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 35 degrees; open 25 degrees.

Contact Spring Tension—17 to 21 oz.

Timing—Exact top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "1-DC" registers with the pointer at the timing hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type 7); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Distributor Control (Delco-Remy, 680-N; Test No. 669)—5 to 6 degrees (Dist. advance). Starts with vacuum of 7 inches of mercury. Requires vacuum of from 9 to 13 inches for full travel. Total plunger travel 5/32 inch.

Vacuum Advance Table (Delco-Remy 680-N Distributor Control).

Inches of Mercury	Degrees Dist. Advance
7.....	Start
7.70.....	1
8.45.....	2
9.20.....	3
9.90.....	4
10.65.....	5
11.00.....	5½ (Max.)

GRAHAM

Series 85, "Crusader" 6 cyl., (1937)

Automatic Advance—9 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
550.....	275.....	Start
1050.....	525.....	2
1550.....	775.....	4
2050.....	1025.....	6
2550.....	1275.....	8
2800 (Max.)	1400.....	9

Condenser—Delco-Remy, 829092. Capacity .20 to .25 (mfd.).

Ignition Coil—Delco-Remy, 536-J.

Ignition Switch and Cable—Delco-Remy, 431-U.

GENERATOR

D-R Test 1254 Rotation, L. H., Com. End Group 24
Delco-Remy, 936-L (Belt Drive)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts
0.....	700.....	6.5
4.....	860.....	6.8
8.....	1040.....	7.2
12.....	1300.....	7.6
16.....	1680.....	7.9
22.....	2800 (Max.)	8.5

Motoring Freely—3½ to 4 amps. at 6 volts.

Max. Stall Current—23 to 26 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1860284.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole move third brush adjustment lever in direction of rotation to increase charging rate. Relock.

RELAY-REGULATOR

D-R Test 1297 Delco-Remy, 5585

A combination Cut-Out Relay and Voltag Operated Two-Stage Charge Regulator

Cut-Out Relay—**Closes**—6.4 to 6.8 volts.
Opens—0 to 3.0 amps. discharge at 6.3 volts.

Contact Gap—.015 to .025 inch.

Core Gap—.012 to .017 inch, contacts closed.

Two-Stage Regulator—**Contact Spring Tension**—.7 to .9 ounces (minimum).

Air Gap—.028 to .040 inches (armature pressed all the way down against stop).

Contact Opening—.008 to .013 inch (armature pressed all the way down against stop).

Armature Travel—.028 to .040 inch (armature released).

Points Open—8.35 to 8.65 volts (70° F.).

Points Close—7.3 to 7.7 volts (70° F.).

LIGHTING

Switch—Delco-Remy, 481-Y.

Location—Behind instrument board.

Fuses—Two 20 amp. fuses (type 3A-20) in fuse block on dash (driver's side).

Horn Relay—Delco-Remy 271-A (if used).

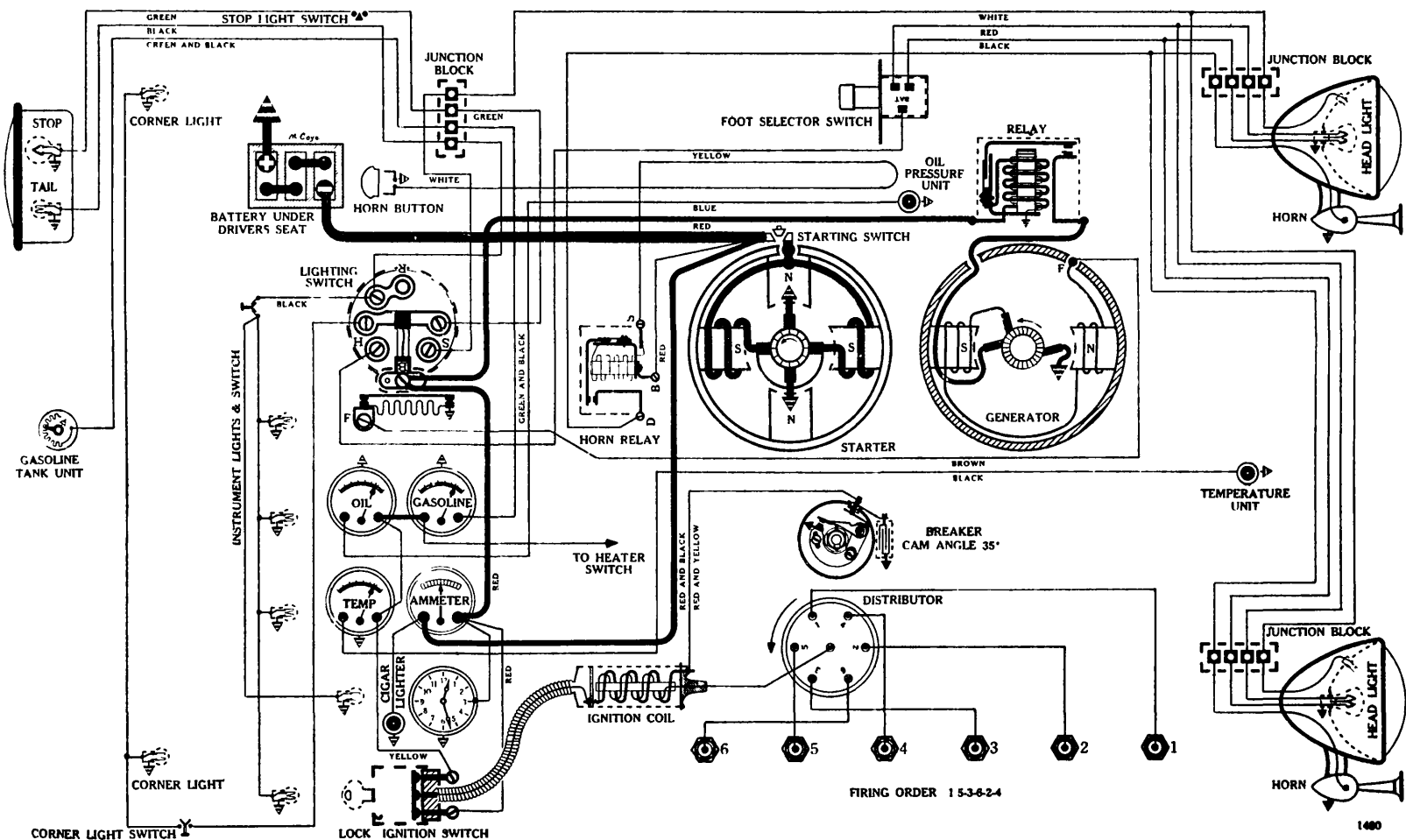
Foot Selector Switch—Clum, No. 9602.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2330; PARK—55; FENDER (if used)—63;
INSTRUMENT—55; DOME—63; STOP—87; TAIL—63.

GRAHAM

Series 95, "Cavalier" 6 cyl., (1937)

Engine { Bore 3-1/4
Strok 4



BATTERY

Willard, WHT-1-90, 6 volts. Positive Terminal Grounded

Starting Capacity—114 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.
Lighting Capacity—4.5 amps. for 20 hours (90 amp. hour).
Case—Length, 9-1/16; width, 7-1/16; height, 8-7/8 inches.

STARTER

D-R Test 368 Rotation, L. H., Com. End Group 46
Delco-Remy, 738-T

Conn ction to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Fr e—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—135 amps. at 5.1 volts.

Engin Cranking Speed—120 R.P.M.

Stall Data (on car)—380 amps. at 3.7 volts.

Lock Torque (for test bench use)—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test 105 Rotation, L. H., Top View Group 82
Delco-Remy, 623-A

(Full Automatic Spark Advance in conjunction with Delco-Remy 681-G Distributor Vacuum Control, which moves the entire Distributor).

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 35 degrees; open 25 degrees.

Contact Spring Tension—17 to 21 oz.

Timing—Exact top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "1-DC" registers with the pointer at the timing hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (Champion type H-10); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Distributor Control (Delco-Remy, 681-G; Test No. 657)—5 degrees (Dist. advance). Starts with vacuum of 5 to 7 inches of mercury. Requires vacuum of 14 to 18 inches for full travel. Total plunger travel 5/32 inch.

Vacuum Advance Table (Delco-Remy, 681-G Distributor Control).

Inches of Mercury	Degrees Dist. Advance
6.	Start
8.	1
10.	2
12.	3
14.	4
16.	5 (Max.)

Automatic Advance—9 degrees (Distributor).

GRAHAM

Series 95, "Cavalier" 6 cyl., (1937)

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
550.....	275.....	Start
800.....	400.....	1
1050.....	525.....	2
1300.....	650.....	3
1550.....	775.....	4
1800.....	900.....	5
2050.....	1025.....	6
2300.....	1150.....	7
2550.....	1275.....	8
2800 (Max.)	1400.....	9

Condenser—Delco-Remy, 829092. Capacity .20 to .25 (mfd.).

Ignition Coil—Delco-Remy, 536-J.

Ignition Switch and Cable—Delco-Remy, 435-P.

GENERATOR

D-R Test 1250 Rotation, L. H., Com. End Group 48
Delco-Remy, 948-B (Belt Drive)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts
0.....	750.....	6.5
4.....	875.....	6.9
8.....	1000.....	7.2
12.....	1250.....	7.5
16.....	1600.....	7.9
20.....	2400 (Max.)	8.2

Motoring Freely—3½ to 4 amps. at 6 volts.

Max. Stall Current—32 to 34 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes 22 to 26 oz.
Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1853593.

Third Brush Adjustment—Loosen third brush adjustment lock screw on outside of commutator end frame. By working thru top ventilating hole the third brush may be moved. On generators of this type the third brush should be set so that it is about two commutator bars from the insulated main brush.

RELAY

D-R Test 606-A Delco-Remy, 265-H

Closes—6.75 to 7.5 volts.

Opens—0 to 2.5 amps. discharge.

Contact Gap—.020 in ch.

Core Gap—.015 inch, contacts closed.

LIGHTING

Switch—Delco-Remy 481-X (with generator field resistance).

NOTE:—This switch is so designed that by pulling knob one position the field resistance is shorted out, resulting in maximum charging, with no lights burning.

Location—Behind instrument board (left side).

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back.

Horn Relay—Delco-Remy, 271-A.

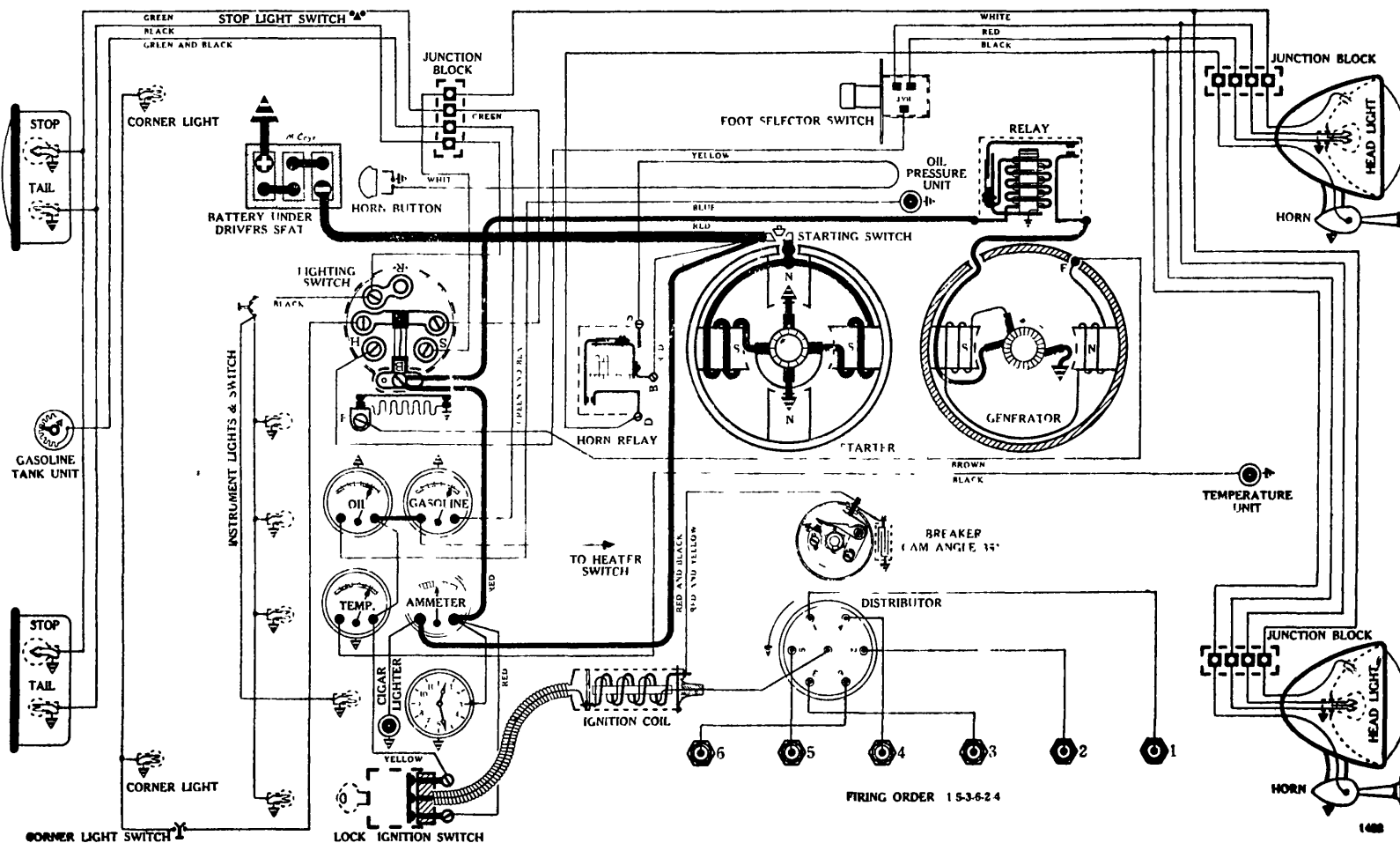
Foot Selector Switch—H. A. Douglas, No. 5530.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2330; PARK—55; FENDER (if used)—63;
INSTRUMENT—55; DOME—63; STOP—87; TAIL—63.

GRAHAM

Series 116, "Supercharger" 6 cyl., (1937)

Engine { Bore 3-1/4
Strok 4



BATTERY

Willard, WHT-2-105, 6 volts. Positive Terminal Grounded

Starting Capacity—125 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.9

Lighting Capacity—5.2 amps. for 20 hours (105 amp. hour).

Case—Length, 10-5/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

D-R T st 368 Rotation, L. H., Com. End Group 46
Delco-Remy, 738-T

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Fre —65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—160 amps. at 5.1 volts.

Engine Cranking Speed—168 R.P.M.

Stall Data (on car)—370 amps. at 4.1 volts.

Lock Torqu (for t st bench use)—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test 145 Rotation, L. H., Top View Group 82
Delco-Remy, 623-S

(Full Automatic Spark Advance in conjunction with Delco-Remy 681-G Distributor Vacuum Control, which moves the entire Distributor.)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 35 degrees; open 25 degrees.

Contact Spring Tension—17 to 21 oz.

Timing—4 degrees past top dead center. Slowly turn engine until No. 1 piston has come completely up on the compression stroke, and started down on the power stroke. Stop when the flywheel mark "Ign" (found 4 degrees or approximately 3/8 inch behind the flywheel mark "1-DC") registers with the pointer at the timing hole. With rotor under No. 1 Dist. Cap Terminal breaker points should just open.

Spark Plugs—14-MM (Champion type H-10); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Distributor Control (Delco-Remy, 681-G; Test No. 657)—5 degrees (Dist. advance). Starts with vacuum of 5 to 7 inches of mercury. Requires vacuum of 14 to 18 inches for full travel. Total plunger travel 5/32 inch.

Vacuum Advance Table (Delco-Remy, 681-G Distributor Control).

Inches of Mercury	Degrees Dist. Advance
6.	Start
8.	1
10.	2
12.	3
14.	4
16.	5 (Max.)

GRAHAM

Series 116, "Supercharged" 6 cyl., (1937)

Automatic Advance—8 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
430.....	215.....	Start
550.....	275.....	1
670.....	335.....	2
800 (Intermediate)	400.....	3
1040.....	520.....	4
1280.....	640.....	5
1520.....	760.....	6
1760.....	880.....	7
2000 (Max.)	1000.....	8

Condenser—Delco-Remy, 829092. Capacity .20 to .25 (mfd.).

Ignition Coil—Delco-Remy, 539-M.

Ignition Switch and Cable—Delco-Remy, 435-F.

GENERATOR

D-R Test 1250 Rotation, L. H., Com. End **Group 43**
Delco-Remy, 948-B (Belt Drive)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts
0.....	750.....	6.5
4.....	875.....	6.9
8.....	1000.....	7.2
12.....	1250.....	7.5
16.....	1600.....	7.9
20.....	2400 (Max.)	8.2

Motoring Freely—3½ to 4 amps. at 6 volts.

Max. Stall Current—32 to 34 amps. at 6 volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes 22 to 26 oz.
Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1853593.

Third Brush Adjustment—By working through top ventilating hole the third brush may be moved. On generators of this type the third brush should be set so that it is about two commutator bars from the insulated main brush.

RELAY

D-R Test 606-A Delco-Remy, 265-H

Closes—6.75 to 7.5 volts.

Opens—0 to 2.5 amps. discharge.

Contact Gap—.020 inch.

Core Gap—.015 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 481-X (with generator field resistance).

NOTE:—This switch is so designed that by pulling knob one position the field resistance is shorted out, resulting in maximum charging, with no lights burning.

Location—Behind instrument board (left side).

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back.

Horn Relay—Delco-Remy, 271-A.

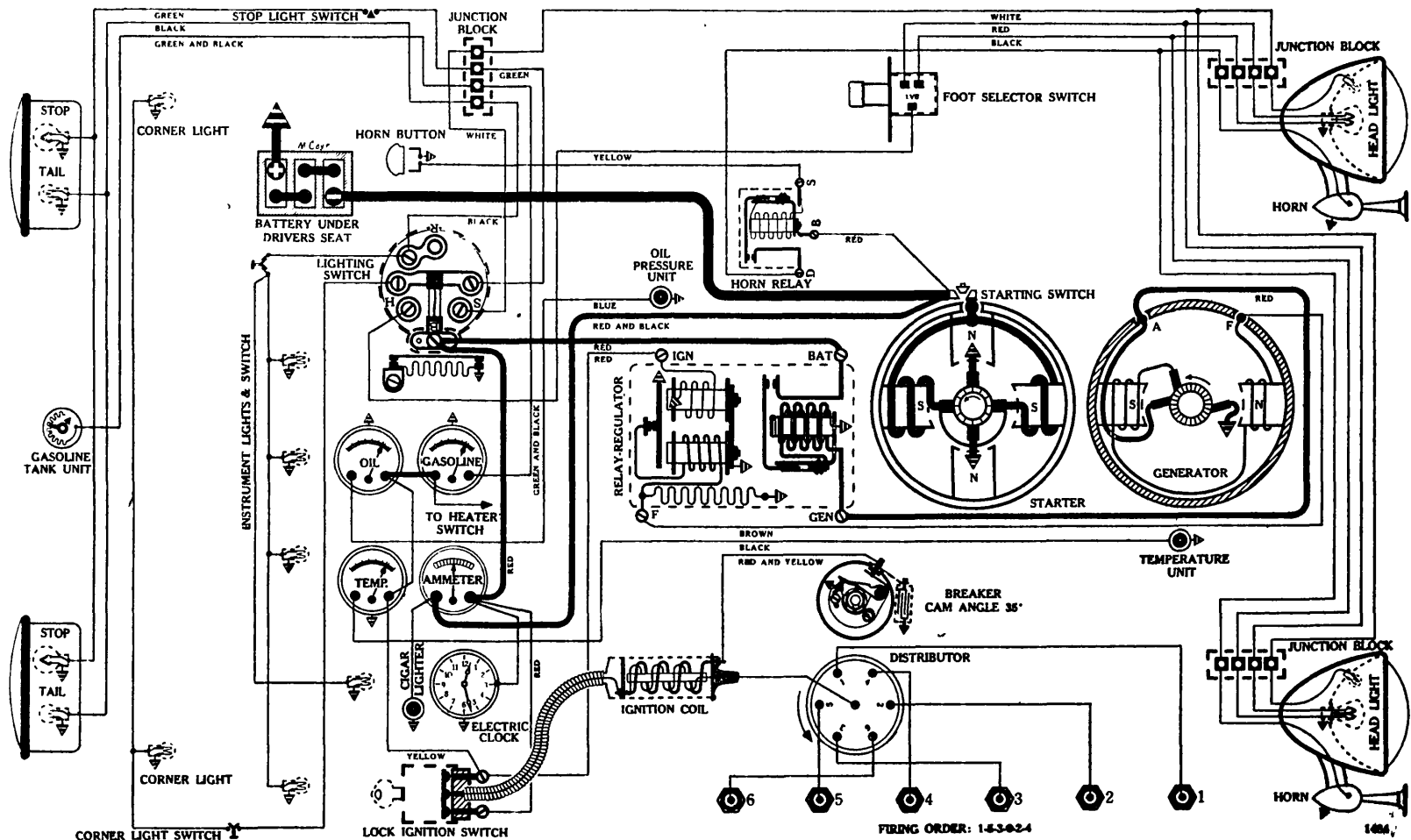
Foot Selector Switch—H. A. Douglas, No. 5530.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2330; PARK—55; FENDER (if used)—63;
INSTRUMENT—55; DOME—63; STOP—87; TAIL—63.

GRAHAM

Engin { Bore 3-1/4
Strok 4-3/8

S ries 120, Custom "Supercharger" 6 cyl., (1937)



BATTERY

Willard, WHT-2-105, 6 volts. Positive Terminal Grounded

Starting Capacity—125 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.9
Lighting Capacity—5.2 amps. for 20 hours (105 amp. hour).
Cas —Length, 10-5/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

D-R T st 368 Rotation, L. H., Com. End Group 46
Delco-Remy, 738-T

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Running Fre —65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—160 amps. at 5.1 volts.

Engine Cranking Speed—168 R.P.M.

Stall Data (on car)—370 amps. at 4.1 volts.

Lock Torqu (for t st bench use)—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test 145 Rotation, L. H., Top View Group 82
Delco-Remy, 623-S

(Full Automatic Spark Advance in conjunction with Delco-Remy 681-C Distributor Vacuum Control, which moves the entire Distributor.)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 35 degrees; open 25 degrees.

Contact Spring Tension—17 to 21 oz.

Timing—4 degrees past top dead center. Slowly turn engine until No. 1 piston has come completely up on the compression stroke, and started down on the power stroke. Stop when the flywheel mark "Ign" (found 4 degrees or approximately 3/8 inch behind the flywheel mark "1-DC") registers with the pointer at the timing hole. With rotor under No. 1 Dist. Cap Terminal breaker points should just open.

Spark Plugs—14-MM (Champion type H-10); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Distributor Control (Delco-Remy, 681-C; Test No. 1910)—5 degrees (Dist. advance). Starts with vacuum of 5 to 7 inches of mercury. Requires vacuum of 13 to 16 inches for full travel. Total plunger travel 7/64 inch.

Vacuum Advance Table (Delco-Remy, 681-C Distributor Control).

Inches of Mercury	Degrees Dist. Advance
6.	Start
7.70.....	1
9.40.....	2
11.10.....	3
12.80.....	4
14.50.....	5 (Max.)

GRAHAM

S ri s 120, Custom "Sup rcharg r" 6 cyl., (1937')

Automatic Advance—8 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
430.....	215.....	Start
550.....	275.....	1
670.....	335.....	2
800 (Intermediate)	400.....	3
1040.....	520.....	4
1280.....	640.....	5
1520.....	760.....	6
1760.....	880.....	7
2000 (Max.)	1000.....	8

Condenser—Delco-Remy, 829092. Capacity .20 to .25 (mfds.).

Ignition Coil—Delco-Remy, 539-M.

Ignition Switch and Cable—Delco-Remy, 435-P.

GENERATOR

D-R Test 1271 Rotation, L. H., Com. End **Group 48**
Delco-Remy, 948-Z (Belt Drive)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts
0.....	750.....	6.5
4.....	900.....	6.9
8.....	1100.....	7.3
12.....	1350.....	7.7
16.....	1750.....	8.1
22.....	3300 (Max.)	8.5

Motoring Freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5½ volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Charging Adjustment—Fixed third brush. External vibrating point voltage regulation.

RELAY-REGULATOR

D-R Test 1294 Delco-Remy, 5812

A combination of Cut-Out Relay and Vibrating Voltage Regulator

Cut-Out Relay—**Closes**—6.5 to 7.0 volts.
Opens—0 to 3 amps. discharge at 6.3 volts.

Contact Gap—.018 to .025 inch.

Core Gap—.018 to .022 inch, contacts closed.

Voltage Regulator—**Contact Spring Tension**—2.7 to 3.5 ounces (minimum).

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Circuit Voltage—This voltage regulator must be adjusted on a closed circuit only.

Voltage Setting—Regulator operates at 7.55 to 7.85 volts, with a generator charging rate of from 8 to 10 amps. (70° F.), and running between 2800 to 3000 R.P.M. Connect voltmeter between terminal marked "Ign" and ground.

LIGHTING

Switch—Delco-Remy, 481-X.

Location—Behind instrument board (left side).

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back.

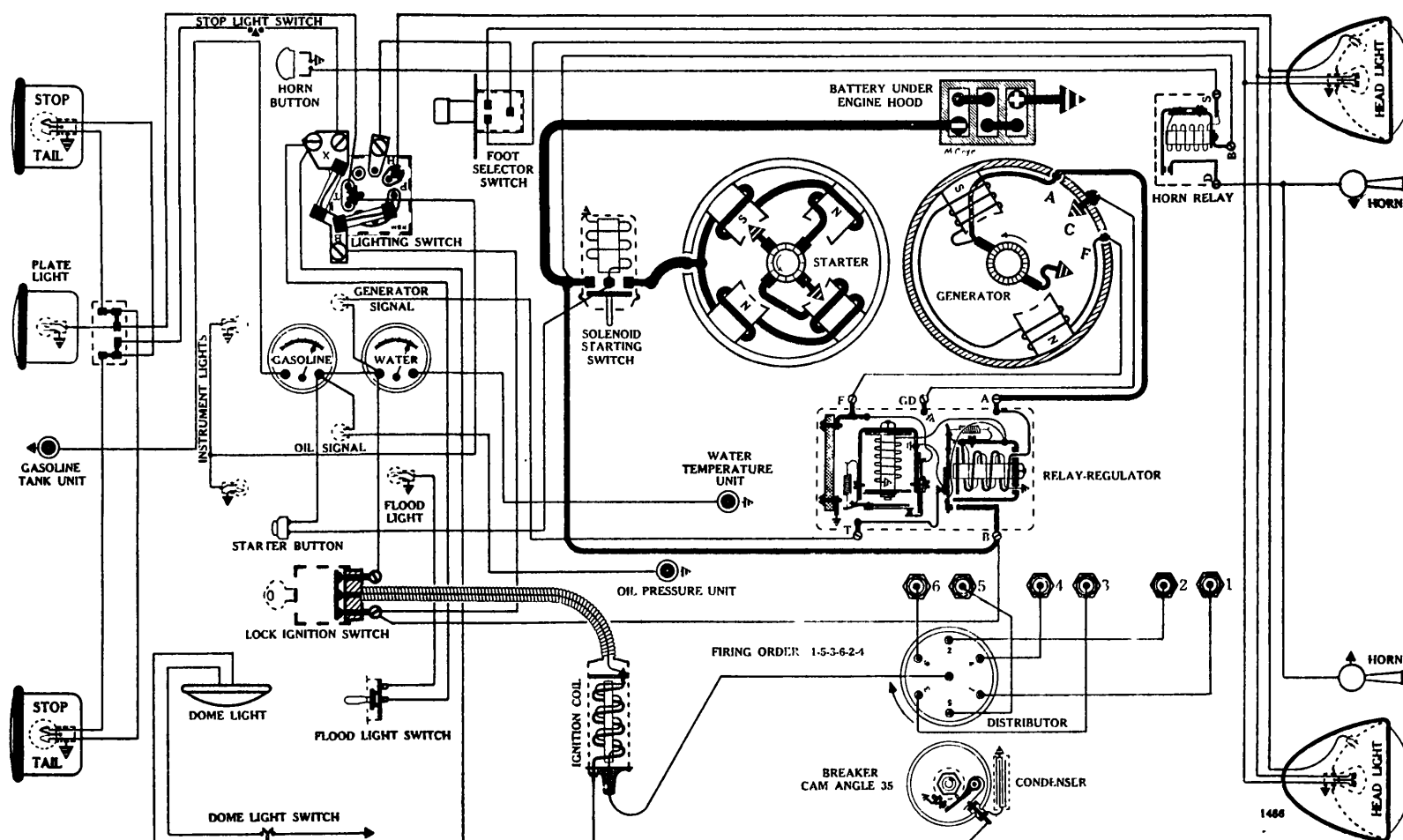
Horn Relay—Delco-Remy, 271-A.

Foot Selector Switch—H. A. Douglas, No. 5530.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2330; PARK—55; FENDER (if used)—63;
INSTRUMENT—55; DOME—63; STOP—87; TAIL—63.

HUDSON

Model 73, 6 cyl., (1937)

Engin { Bor 3
Strok 5**BATTERY**

National, ST3-17X, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.2

Lighting Capacity—4.9 amps. for 20 hours (98 amp. hour).

Case—Length, 10-9/16; width, 7 1/4; height, 7-15/16 inches.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End
Auto-Lite, MAB-4075

Conn ction to Engine—Bendix Drive, Type A-1673.

Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.

Cranking Engine—120 amps. at 5.55 volts.

Engine Cranking Speed—144 R.P.M.

Stall Data (on car)—440 amps. at 4.3 volts.

Lock Torque (for test bench use)—15 1/2 pound-feet, 582 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Sol noid Starting Switch—Auto-Lite, SS-4001.

Push Button Starting Control Switch—R.B.M., No. 1815.

Armature—Auto-Lite, MAB-2113.

IGNITION

A-L Test 447 Rotation, R. H., Top View

Auto-Lit , IGW-4013-A

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 35 degrees; open 25 degrees.

Contact Spring Tension—18 to 20 oz.

Timing—Exact top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "U.D.C. 1-6" registers with pointer cast in flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs (Standard Head)—14-MM (Champion type J-8); Gap .025 inch.

(Super Power Dome Head)—14-MM (Champion type H-10); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—14 degrees (Distributor).

NOTE:—The Hudson, 6 cyl. car, in 1936 used an IGB-4301-B distributor (A-L Test 447), which is the same test as this curve; however, in 1936 the peak of 14 degrees was given at a speed of 1580 R.P.M. This year it is given as 1575 R.P.M.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600.....	300.....	Start
666.....	333.....	1
734.....	367.....	2
800 (Intermediate)	400.....	3
1014.....	507.....	4
1228.....	614.....	5
1442.....	721.....	6
1656.....	828.....	7
1870.....	935.....	8
2084.....	1042.....	9
2298.....	1149.....	10
2512.....	1256.....	11
2726.....	1363.....	12
2940.....	1470.....	13
3150 (Max.)	1575.....	14

Ign. Coil, Lock Switch and Cable Assembly Compl t —
A-L, IG-4644.

HUDSON

Mod 173, 6 cyl., (1937)

Ign. Coil Only—A-L, IG-3224-S.
Ign. Switch and Cable Assembly Less Lock—A-L,
CE-2233-FS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GCJ-4803-A (Belt Drive)

NOTE:—This is an especially designed third brush current control generator, to be operated in conjunction with a vibrating-point voltage regulator. The following performance readings were taken with the generator field terminal grounded to the generator frame and the voltage regulator inoperative.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	825.....	6.2
2.....	870.....	6.38
4.....	915.....	6.55
6.....	960.....	6.7
8.....	1020.....	6.89
10.....	1075.....	7.05
12.....	1135.....	7.22
14.....	1200.....	7.38
16.....	1270.....	7.53
18.....	1340.....	7.7
20.....	1430.....	7.89
22.....	1545.....	8.05
24.....	1720.....	8.2
25.....	1850 (Max.).....	8.3

Motoring Freely—4.0 to 4.4 amps. at 6 volts.

Max. Stall Current—28 to 30 amps. at 5.2 volts.

Field Test—1.9 to 2.1 amps. at 6 volts.

Brush Spring Tension—27 to 53 oz. (new brushes).

Armature—Auto-Lite, GCJ-2006.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite VRD-4003-B with TC-51L Field Resistance Unit

A combination Cut-Out Relay and Vibrating-Point Voltage Regulator. Complete instructions for testing

and servicing Regulators of this type, together with trouble shooting charts, will be found in the Technical Section of this Manual, under the "Generator Charge Regulator" classification.

IMPORTANT! Early production cars came through with Auto-Lite VRD-4003-A Regulators. These regulators were designed to operate at too low a voltage, which resulted in discharged batteries. When the "A" units are found on a car the "B" regulator should be substituted.

Cut-Out Relay— Points Close—6.5 to 7.25 volts.
Points Open—.5 to 3.0 amps. discharge.
Contact Gap—.015 inch minimum (points open).
Armature Air Gap—.034 to .038 inch (points open).
Voltage Regulator— Contact Spring Tension—24 oz.
Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).
Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).
Voltage Setting—7.7 to 8.2 (70° F.).

LIGHTING

Switch—R.B.M. Mfg. Co., No. 1700.

Location—Behind instrument board.

Fuses—Two 20 amp. fuses (type 3A-20) mounted on switch back. The fuse which connects terminals "B" to "X" protects Dome, Stop Light, Cigar Lighter, and Flood Lamp circuits. The other fuse protects lighting circuits.

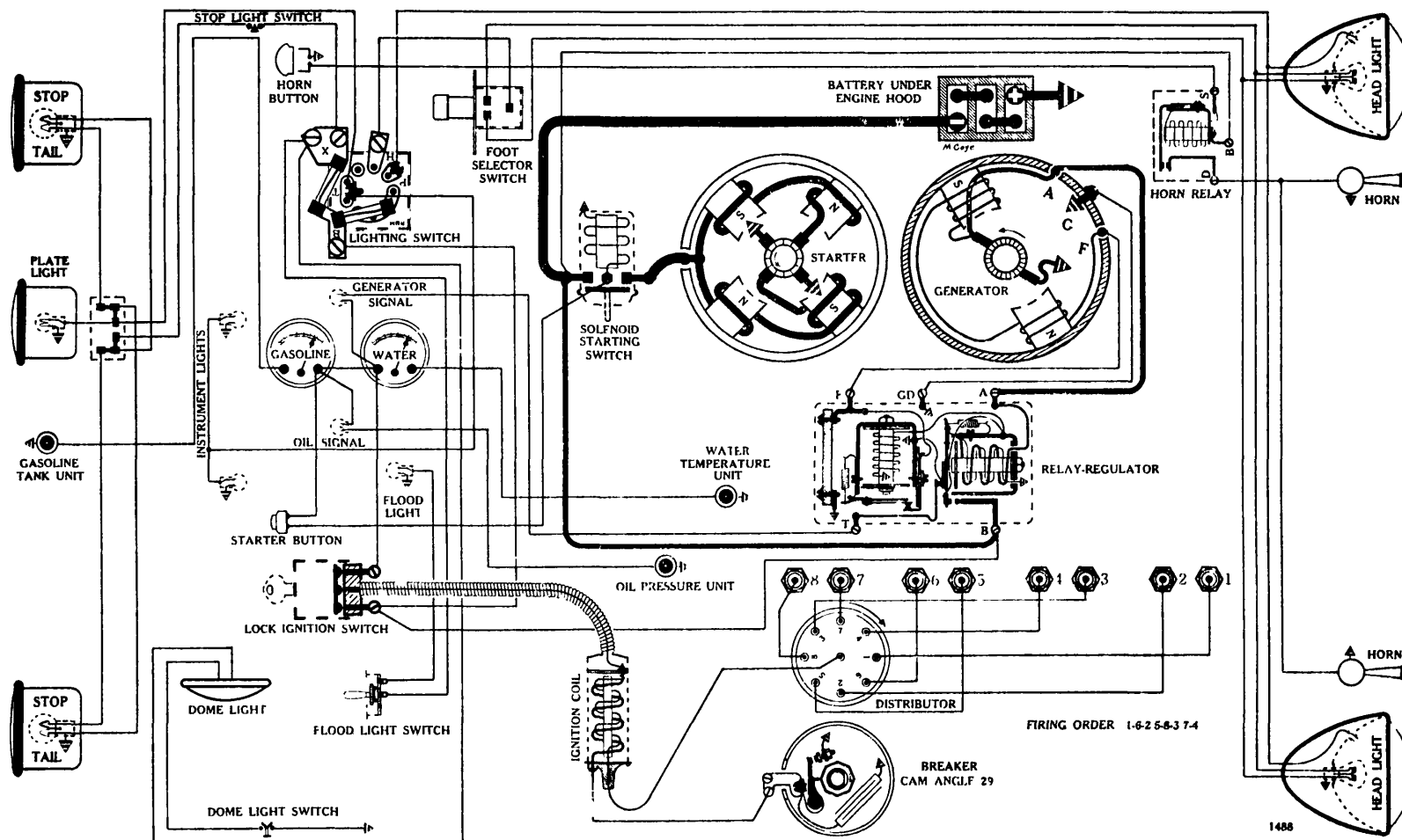
Foot Selector Switch—R.B.M. Mfg. Co., No. 1076.

Stop Light Switch—R.B.M. Mfg. Co., No. 965.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2331; PARK—55; FENDER—63; SIGNALS—51; INSTRUMENT—55; SERVICE—51; LICENSE PLATE—63; DOME—87; STOP AND TAIL—1158.

HUDSON

Models 74, 75, 76 and 77, Straight Eights, (1937)

Engine { Bore 3
Strok 4-1/2

BATTERY

National, ST3-19X, 6 volts. Positive Terminal Grounded

Starting Capacity—135 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—4.3

Lighting Capacity—5.5 amps. for 20 hours (110 amp. hour).

Case—Length, 11 3/4; width, 7 1/4; height, 8-1/16 inches.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End
Auto-Lite, MAB-4075

Connection to Engine—Bendix Drive, Type A-1673.

Running Fre —60 amps. at 5 1/2 volts, 3700 R.P.M.

Cranking Engine—150 amps. at 5.6 volts.

Engine Cranking Speed—144 R.P.M.

Stall Data (on car)—440 amps. at 4.3 volts.

Lock Torque (for test bench use)—15 1/2 pound-feet, 582 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4001.

Push Button Starting Control Switch—R.B.M., No. 1815.

Armature—Auto-Lite, MAB-2113.

IGNITION

A-L Test 448 Rotation, R. H., Top View
Auto-Lite, IGP-4008-A
(Full Automatic Spark Advance)

Breaker—Contact separation .018 inch.

Cam Angles—Points closed 29 degrees; open 16 degrees.

Contact Spring Tension—18 to 20 oz.

Timing—Exact top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke.

Stop when flywheel mark "U.D.C. 1-8" registers with pointer cast in flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (Champion type J-8, used with standard compression engines. Champion type H-10 used with engines having compression ratio of 7 to 1); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—17 1/2 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600.....	300.....	Start
734.....	367.....	2
800 (Intermediate)	400.....	3
980.....	490.....	4
1340.....	670.....	6
1700.....	850.....	8
2060.....	1030.....	10
2420.....	1210.....	12
2780.....	1390.....	14
3140.....	1570.....	16
3400.....	1700 (Max.)	17 1/2

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CE-4625.

Ign. Coil Only—A-L, CE-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-2233-FS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GCJ-4803-A (Belt Drive)

NOTE:—This is an especially designed third brush current control generator, to be operated in conjunction with a vibrating-point voltage regulator. The following performance readings were taken with the generator field terminal grounded to the generator frame and the voltage regulator inoperative.

HUDSON

M dels 74, 75, 76 and 77, Straight Eights, (1937)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	825.....	6.2
2.....	870.....	6.38
4.....	915.....	6.55
6.....	960.....	6.7
8.....	1020.....	6.89
10.....	1075.....	7.05
12.....	1135.....	7.22
14.....	1200.....	7.38
16.....	1270.....	7.53
18.....	1340.....	7.7
20.....	1430.....	7.89
22.....	1545.....	8.05
24.....	1720.....	8.2
25.....	1850 (Max.).....	8.3

Motoring Freely—4.0 to 4.4 amps. at 6 volts.

Max. Stall Current—28 to 30 amps. at 5.2 volts.

Field Test—1.9 to 2.1 amps. at 6 volts.

Brush Spring Tension—27 to 53 oz. (new brushes).

Armature—Auto-Lite, GCJ-2006.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite VRD-4003-B with TC-51L Field Resistance Unit

A combination Cut-Out Relay and Vibrating-Point Voltage Regulator. Complete instructions for testing and servicing Regulators of this type, together with trouble shooting charts, will be found in the Technical Section of this Manual, under the "Generator Charge Regulator" classification.

IMPORTANT! Early production cars came through with Auto-Lite VRD-4003-A Regulators. These reg-

ulators were designed to operate at too low a voltage, which resulted in discharged batteries. When the "A" units are found on a car the "B" regulator should be substituted.

Cut-Out Relay— **Points Close**—6.5 to 7.25 volts.
Points Open—.5 to 3.0 amps. discharge.
Contact Gap—.015 inch minimum (points open).
Armature Air Gap—.034 to .038 inch (points open).
Voltage Regulator—Contact Spring Tension—24 oz.
Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).
Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).
Voltage Setting—7.7 to 8.2 (70° F.).

LIGHTING

Switch—R.B.M. Mfg. Co., No. 1700.

Location—Behind instrument board.

Fuses—Two 20 amp. fuses (type 3A-20) mounted on switch back. The fuse which connects terminals "B" to "X" protects Dome, Stop Light, Cigar Lighter, and Flood Lamp circuits. The other fuse protects lighting circuits.

Foot Selector Switch—R.B.M. Mfg. Co., No. 1076.

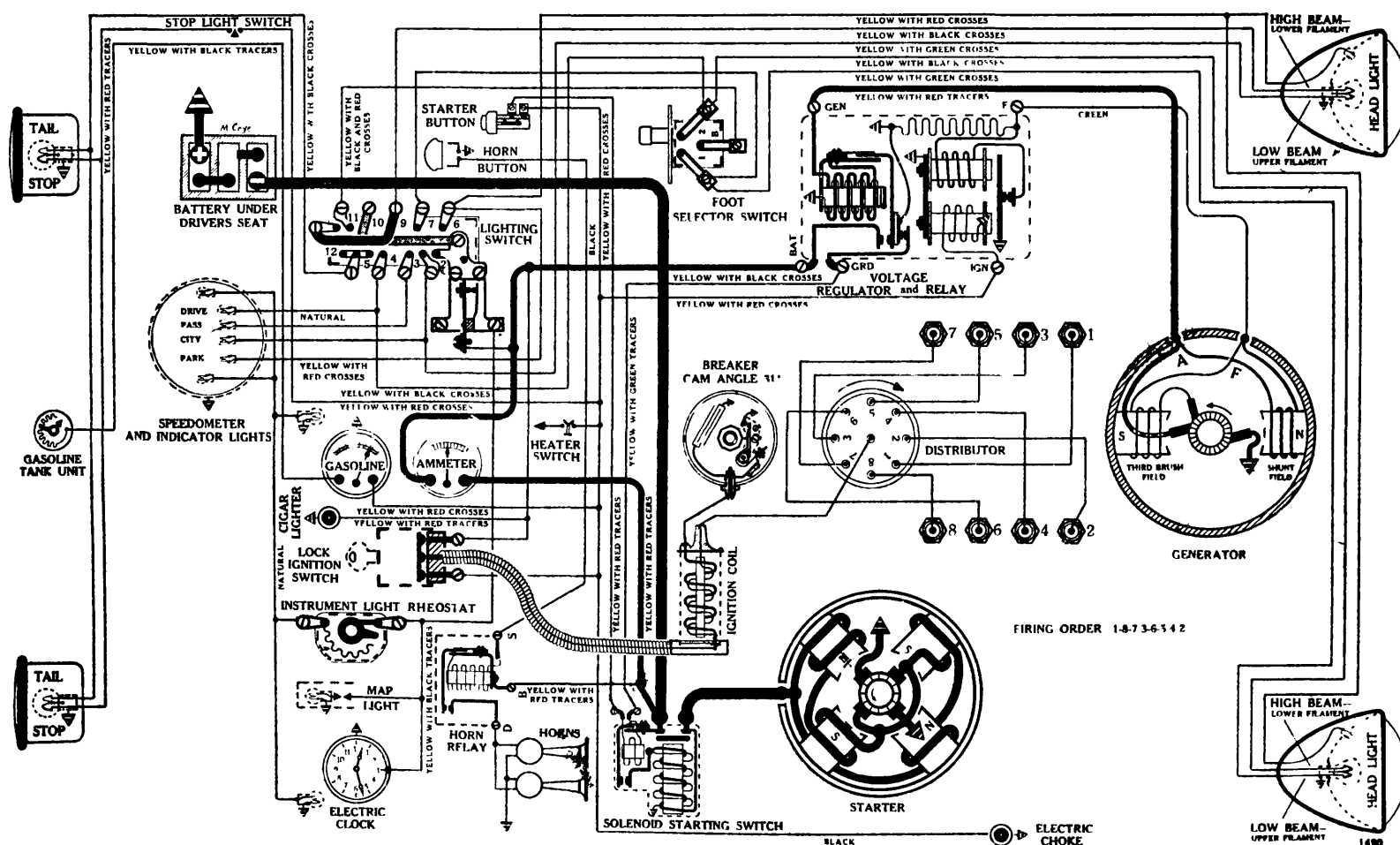
Stop Light Switch—R.B.M. Mfg. Co., No. 965.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2331; **PARK**—55; **FENDER**—63; **SIGNALS**—51; **INSTRUMENT**—55; **SERVICE**—51; **LICENSE PLATE**—63; **DOME**—87; **STOP AND TAIL**—1158.

LA SALLE

Engine { Bore 3-3/8
Stroke 4-1/2

Series 37-50, 90 Degree "Vee" Eight, (1937)

**BATTERY**

Delco-Remy, 17-K, 6 volts. Positive Terminal Grounded

Starting Capacity—131 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—4.4

Lighting Capacity—5.5 amps. for 20 hours (110 amp. hour).

Case—Length, 10 3/8; width, 7; height, 8 5/8 inches.

STARTER

D-R T st 396 Rotation, L. H., Com. End Group 47
Delco-Remy, 727-V

Conn ction to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch located on the instrument board, working in conjunction with a remote control relay (located in solenoid unit), and an auxiliary set of grounding points located on cut-out relay armature in the apparatus box. Feed for solenoid control circuit is taken from the ignition switch.

Start r Pinion and Clutch Assembly—Delco-Remy, 1843041.

Number Teeth on Pinion—9.

Number Teeth on Flywheel—156.

Cranking Ratio—17.33 to 1.

Running Free—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—150 amps. at 5.5 volts.

Engine Cranking Speed—84 R.P.M.

Stall Data (on car)—450 amps. at 4 volts.

Lock Torque (for test bench use)—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1542.

Push Button Starting Control Switch—Delco-Remy, 1389.

Armature—Delco-Remy, 820158.

IGNITION

D-R Test 135 Rotation, R. H., Top View Group 65
Delco-Remy, 665-G

(Full Automatic Spark Advance)

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Distributor Quadrant—Before timing ignition, set pointer in line with "O" graduation on scale.

Timing—5 degrees before top dead center. Slowly turn engine until No. 1 piston (front cylinder, left bank) is coming up on compression stroke. Stop when "IG-A" mark on shaft pulley, located 5 degrees or 1/4 inch ahead of T.D.C., registers with the pointer on the timing chain case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-7); Gap .025 to .027 inch.

Firing Order—1-8-7-3-6-5-4-2.

NOTE:—All odd cylinder numbers on left bank, No. 1 nearest radiator. All even numbers on right bank (see diagram).

Automatic Advance—12 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
870.....	435.....	Start
1390.....	695.....	2
1910.....	955.....	4
2430.....	1215.....	6
2950.....	1475.....	8
3470.....	1735.....	10
4000 (Max.)	2000.....	12

LA SALLE

Series 37-50, 90 Degree "Vee" Eight, (1937)

Condenser—Delco-Remy, 829107.
Ignition Coil—Delco-Remy, 539-C. Amperage draw 4.4 (engine stopped); 2.2 (engine idling).
Ignition Switch and Cable—Delco-Remy, 435-K.

GENERATOR

D-R Test 1632 Rotation, L. H., Com. End Group 35-A
 Delco-Remy, 918-C (Belt Drive)

NOTE:—This is a two pole split field generator. One pole carries a third brush field winding, while the other pole has a straight shunt field winding. The grounding end of both windings is connected to a voltage regulator, through the generator "F" terminal. Two different types of shunt field coils have been built for these generators. The first type, shown on Page 1452, developed trouble, the result of the insulated shunt field lead coming in contact with the revolving armature, thereby cutting it off. When this happens the generator output will drop to approximately 10 amps. New type shunt field coils should be used in servicing generators. The field coils should be connected as shown on this diagram. In testing generators of this type ground the "F" terminal, and operate them without the voltage regulator.

Performance Data—Gen. cold. Generator "F" terminal grounded. No voltage regulation.

Amps.	R.P.M.	Volts
0	800	6.3
2	900	6.5
4	975	6.7
6	1050	6.9
8	1150	7.1
10	1235	7.3
12	1335	7.5
14	1475	7.6
16	1600	7.7
18	1760	7.8
20	1925	7.9
22	2180	8.0
24	2450	8.1
26	3100	8.3
27	4000 (Max.)	8.4

Motoring Freely—4.5 to 7 amps. at 6 volts.

Motoring R.P.M.—900 to 1000 R.P.M. at 6 volts.

Max. Stall Current—28 to 34 amps. at 5 volts.

Field Tests—Shunt Coil, 1.35 to 1.50 amps. at 6 volts.
 Third Brush Coil, .83 to .88 amps. at 6 volts.

Total Field Amps., 2.0 to 2.3 amps. at 6 volts.

Field Resistance in Ohms at 75° F.—

Shunt Coil, 4 to 4.25 ohms.

Third Brush Coil, 6.6 to 7.1 ohms.

Brush Spring Tension—Main brushes, 22 to 26 oz.
 Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1866789.

Armature End Play—.005 inch (maximum).

Third Brush—Fixed (no adjustment).

Charging Adjustment—External vibrating-point voltage regulation.

RELAY-REGULATOR

D-R Test 1294 Delco-Remy, 5817

A combination of Cut-Out Relay and Vibrating Voltage Regulator

Cut-Out Relay—**Closes**—6.5 to 7.0 volts.
Opens—0 to 3 amps. discharge at 6.3 volts.

Contact Gap—.018 to .025 inch.

Core Gap—.018 to .022 inch, contacts closed.

Voltage Regulator—**Contact Spring Tension**—2.7 to 3.5 ounces (minimum).

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Circuit Voltage—This voltage regulator must be adjusted on a closed circuit only.

Voltage Setting—Regulator operates at 7.55 to 7.85 volts, with a generator charging rate of from 8 to 10 amps. (70° F.), and running between 2800 to 3000 R.P.M. Connect voltmeter between terminal marked "Ign." and ground.

Solenoid Relay—(Located in Solenoid Unit):

D-R Test 623 **Closes**—1.9 volts (max.).

Opens—1.0 to 1.2 volts.

Contact Gap—.025 to .045 inch.

Core Gap—.010 to .013 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 480-S. A combination switch with overload lighting thermostat.

Location—Behind instrument board.

Overload Thermostat—Delco-Remy, 1866707. Contact points open within one minute at 38 amps. load (70° F.). Contacts remain closed with load of 25 amps. (70° F.).

Horn Relay—Delco-Remy, 271-A.

Foot Selector Switch—Delco-Remy, 471-T.

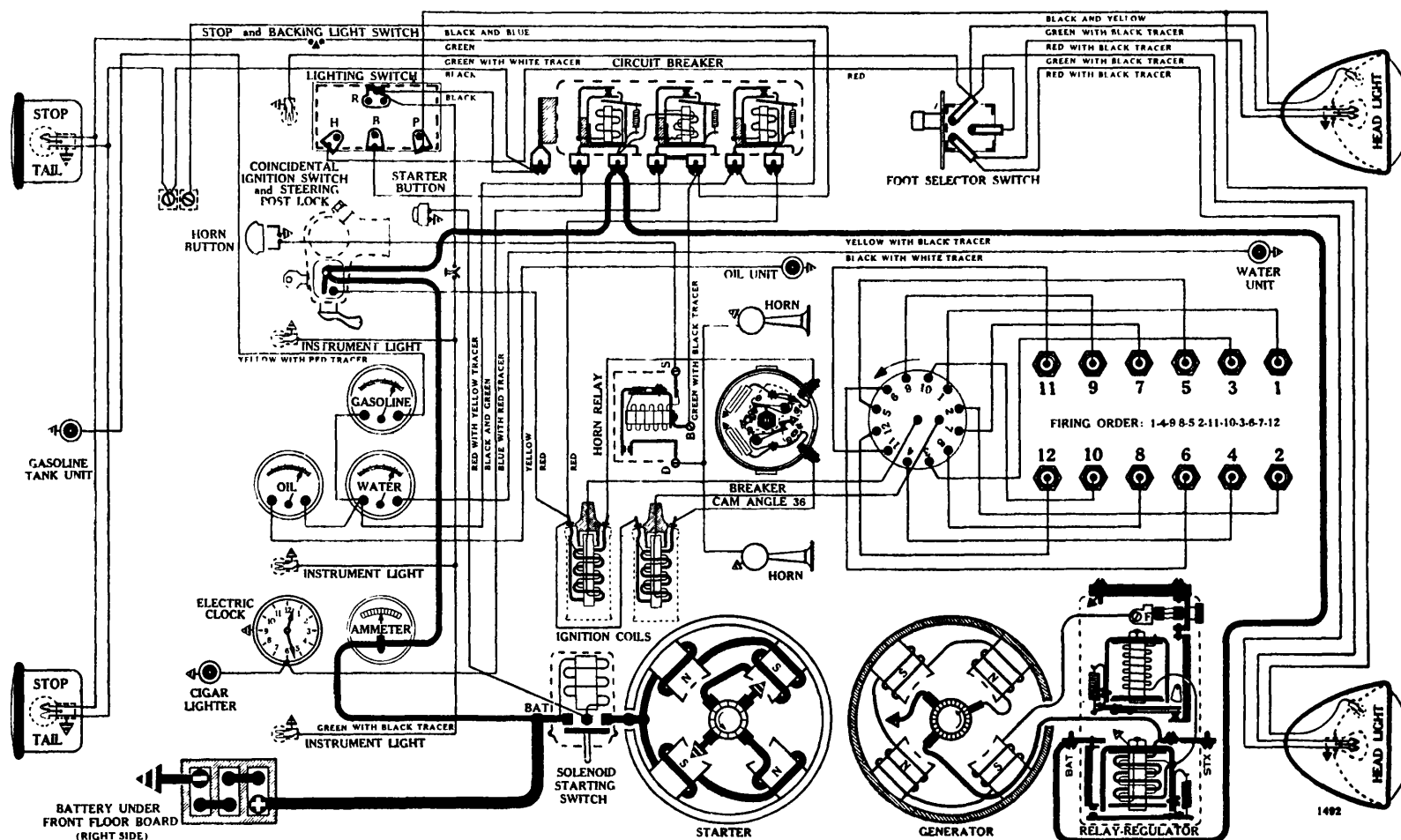
Lamps—Refer to "Lamp Data" in Technical Section.

HEAD—2330 (2530 with 32-50 C.P. filament in right head lamp when State laws permit); **PARK**—55; **MAP LIGHT**—63; **BEAM INDICATORS**—51; **INSTRUMENT**—55; **CLOCK**—51; **DOMES**—87; **LICENSE PLATE**—63; **STOP AND TAIL**—1154*.

*A new type bulb with indexed base to fit special socket. Can be inserted in correct position only.

LINCOLN

Mod 1 K Series, 67 Degree "Vee" 12, (1937)

 Engin { Bore 3-1/8
 { Strok 4-1/2


BATTERY

Exide, X-21-L, 6 volts. Negative Terminal Grounded
 Starting Capacity—175 amps. for 20 minutes.
 Minutes of Discharge at 300 Amps., Zero Degrees F.—6.3
 Lighting Capacity—7.3 amps. for 20 hours (147 amp. hour).
 Length, 14 1/2; width, 7-5/16; height, 8 7/8 inches.

STARTER

A-L Test CU-346 Rotation, L. H., Com. End

Auto-Lite, MAO-4003-B

Connection to Engine—Bendix Drive, Type RB10FXXTD.

Running Free—44 amps. at 5 1/2 volts, 2700 R.P.M.

Cranking Engine—170 amps. at 5.1 volts.

Engine Cranking Speed—102 R.P.M.

Stall Data (on car)—450 amps. at 3.1 volts.

Lock Torque (for test bench use)—34 pound-feet, 715 amps. at 3 volts.

Brush Spring Tension—24 to 32 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4004.

Armatur —Auto-Lite, MAO-2006.

IGNITION

A-L Test 446 Rotation, L. H., Top Vi w
 Auto-Lit , IGM-4003-A

Break rs—Contact separation .020 inch on each.

Cam Angles—Points closed 36 degrees; open 24 degrees.

Contact Spring T nsion—20 to 22 oz. on each.

Synchronizing—Movable points open 33 1/2 degrees after stationary. Unequal intervals of 33 1/2-26 1/2-

33 1/2, etc. degrees between interruptions. The stationary, or right hand set of breaker points control the right hand ignition coil, which distributes current thru the "off-center" high tension terminal on the distributor cap, and fires the right bank, or even numbered cylinders.

Timing—Exact top dead center. Remove inspection cover on flywheel housing. Remove No. 2 spark plug (front cylinder, right block). Slowly turn engine until No. 2 piston is coming up on compression stroke. Stop when flywheel mark "DC 2-12" registers with pointer in flywheel inspection hole. In this position the right hand or stationary set of breaker points should just open.

NOTE—Flywheel marks "A-2" and "A-1" are not used when timing the ignition, and should be disregarded.

Spark Plugs—14-MM (Champion type H-10); Gap .030 inch.

Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.

NOTE—All odd cylinder numbers on left bank; No. 1 nearest radiator. All even numbers on right bank (see diagram). High tension wires run from numbered terminals on Dist. Cap to corresponding numbers on cylinder blocks.

Automatic Advance—12 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600.....	300.....	Start
750.....	375.....	2
900 (Intermediate)	450.....	4
1590.....	795.....	6
2290.....	1145.....	8
2980.....	1490.....	10
3680 (Max.)	1840.....	12

LINCOLN

Model K S ries, 67 D gre "Vee" 12, (1937)

Ignition Coils—Auto-Lite, CE-4001-L.

Ignition Switch—Oakes Steering Post and Ignition Lock, No. 301539.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBC-4103 (Driven by Timing Chain)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts
0.....	400.....	6.3
4.....	460.....	6.7
8.....	520.....	7.
16.....	720.....	7.6
20.....	930.....	7.8
22.....	1250 (Max.)	8.

Motoring Freely—5 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 6 volts.

Field Test—2.4 to 2.7 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5), in regulator unit.

Brush Spring Tension—27 oz. Max. on each (new brushes).

Armature—Auto-Lite, GBC-2035.

Third Brush Adjustment—Turn adjusting screw, found on outside of commutator end housing just below oil cup, clockwise to increase charging rate.

RELAY-REGULATOR

Auto-Lite, TC-4302-A or 4305-A with TC-51

Resistance Unit

A combination of Cut-Out Relay and Voltage Op rated Two-Stage Charge Regulator

Cut-Out Relay—**Points Close**—6.5 to 7.25 volts.
Points Open—.5 to 3.0 amps. discharge.

Contact Gap—.015 inch minimum (points open).

Armature Air Gap—.034 to .038 inch (points open).

Regulator—**Contact Spring Tension**—10 to 12 oz.

A-L Test 119 **Points Open**—8.25 volts (70° F.).
Points Close—7.0 volts.

Contact Opening—.005 inch (minimum).

Core Gap—.020 inch (contacts closed).

For adjustments at other temperatures s complete data in Technical Section.

LIGHTING

Switch—R.B.M. Mfg. Co., No. 2400.

Location—Behind instrument board.

Circuit Breakers—R.B.M. Mfg. Co., No. 1630. Triple combination. Vibrating—Starts 25 to 30 amps. Operates 10 to 15. Lock-Out—Starts 25 to 30 amps. Operates with discharge of less than 1 amp.

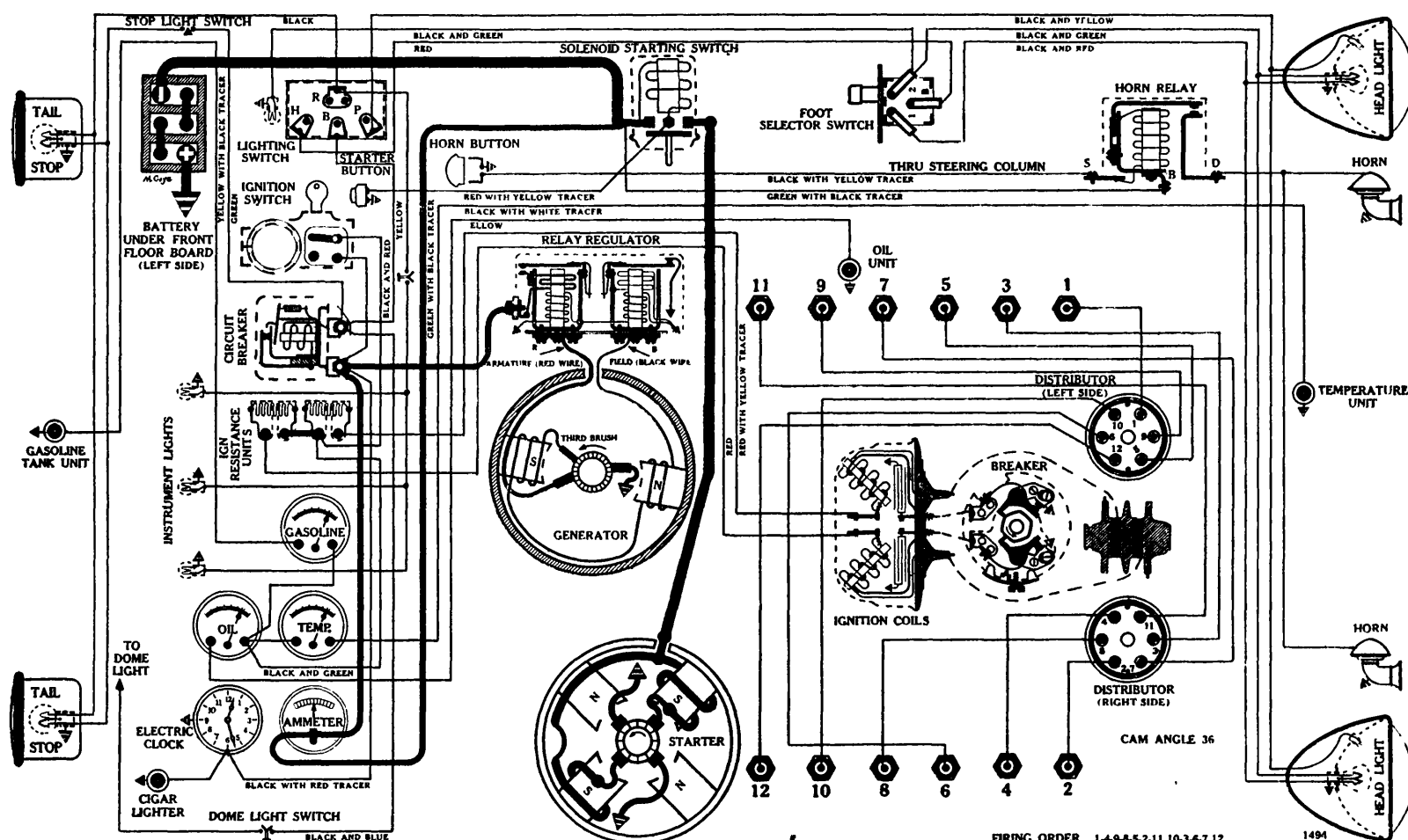
Foot Selector Switch—R.B.M. Mfg. Co., No. 2450.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2320; PARK—55; LICENSE PLATE—63;
INSTRUMENT—81; DOME—81; INDICATOR—51; STOP AND TAIL—1158.

LINCOLN-ZEPHYR

 Engin { Bore 2-3/4
Stroke 3-3/4

75 D gree "Vee" 12, (1937)

**BATTERY**

Ford, 40-10655-C, 6 volts (17 plate). Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.5

Lighting Capacity—4.8 amps. for 20 hours (96 amp. hour).

Case—Length, 10-9/16; width, 7 1/4; height, 7 1/8 inches.

STARTER

Rotation, L. H., Com. End
Zephyr, 18-11001

Conn ction to Engine—Bendix Drive, Type L11FX-10.

Numb r T eth on Pinion—10.

Numb r T th on Flywheel—112.

Cranking Ratio—11.2 to 1.

Running Free—35 to 40 amps. at 6 volts, 3960 R.P.M.

Cranking Engine—210 to 225 amps. at 4.75 volts.

Engine Cranking Speed—100 R.P.M.

Stall Data (on car)—325 amps. at 3.9 volts.

Lock Torque (for test bench use)—14 pound-feet, 500 amps. at 3 volts.

Brush Spring Tension—32 to 36 oz. on each (new brushes).

Armature—Zephyr, 18-11005.

IGNITION

Rotation, L. H., Viewed from Front
Zephyr, Type H-12000

(Full Automatic Spark Advance in conjunction with Vacuum Op rated Governor Brake)

Breakers—Contact separation .014 to .016 inch.

Cam Angles—Points closed from 35 to 38 degrees; open 25 to 22 degrees.

Contact Spring Tension—20 to 24 oz. on each.

Synchronizing—The left hand or stationary set of breaker points (viewed from driver's seat) fire the left cylinder bank. Movable points open 22 1/2 degrees after stationary. Unequal intervals of 22 1/2-37 1/2-22 1/2, etc. degrees between interruptions. To synchronize remove the breaker plate adjusting screw and graduated segment. This will expose an eccentric synchronizing screw which moves the right hand set of breaker points.

Timing—Construction of ignition drive assembly makes it impossible to attach unit to engine other than in correct position. Provision is made for a slight variation in spark timing (3 1/2 degrees plus or minus), by moving the breaker plate adjusting screw (found on right side of distributor housing between mounting flange and right distributor cap) up, to increase spark advance, and down to retard. With the seven graduations divided equally each side of the reference mark on distributor housing, the engine will have an initial spark advance of 4 flywheel degrees, which theoretically is the correct timing position.

Spark Plugs—14-MM (Champion type J-9); Gap .028 inch.

Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.

Automatic Advance—8 degrees (Distributor).

Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist.)
(Tests to be made with Governor free—Vacuum Brake Released)

400.....	200.....	Start
600.....	300.....	2
980.....	490.....	4
1440.....	720.....	6
1900 (Max.)	950.....	8

LINCOLN-ZEPHYR

75 D gr e "Vee" 12, (1937)

NOTE:—Vacuum brake should be so adjusted that with no vacuum to raise the plunger the centrifugal force of the spark advance weights will overcome the brake drag and cam will start to advance at between 400 to 450 R.P.M. (Distributor).

Ignition Coil Current Draw—4.2 amps. (engine stopped); 3.2 amps. (engine idling).

Ignition Switch—Oakes Steering Post and Ignition Lock No. 301490.

GENERATOR

Rotation, L. H., Com. End

Zephyr, 78-10000HA (Belt Drive)

IMPORTANT: Performance data was derived with a load on the battery equal to the generator charging rate at any given time.

Performance Data—Gen. warm.

Amps.	R.P.M.	Volts
0.....	640.....	6.3
2.....	680.....	6.32
4.....	720.....	6.4
6.....	780.....	6.42
8.....	800.....	6.47
10.....	840.....	6.5
12.....	890.....	6.55
14.....	940.....	6.6
16.....	990.....	6.62
18.....	1045.....	6.68
20.....	1110.....	6.7
22.....	1190.....	6.75
24.....	1280.....	6.8
26.....	1400.....	6.82
28.....	1600.....	6.88
29.....	1700 (Max.).....	6.9

Motoring Fr ely—5 to 5½ amps. at 6 volts.

Max. Stall Current—32 to 34 amps. at 5.2 volts.

Field Test—4 to 4.2 amps. at 6 volts.

Brush Spring Tension—24 to 28 oz. on main; 20 to 24 oz. on third.

Armature Speed—1.2 times engine speed.

Armature—Zephyr, 78-10005-H.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Zephyr, 68-10505

A combination Cut-Out Relay and Voltag Operated Two-Stage Charge Regulator

Cut-Out Relay— Closes—6½ to 7 volts.
Opens—0 to 2½ amps. discharge.
Contact Gap—.015 to .020 inch.
Core Gap—.010 inch, contacts closed.

Regulator— Points Open—8.4 volts.
Points Close—7.3 volts.

NOTE:—Regulator cover spot welded to base. Adjustments not recommended. Replace defective unit with new one.

LIGHTING

Switch—R.B.M. Mfg. Co., No. 2400.

Location—Behind instrument board.

Circuit Breaker—R.B.M. Mfg. Co., No. 1640. Starts to operate with discharge of from 25 to 30 amps. Operates with discharge of from 10 to 15 amps.

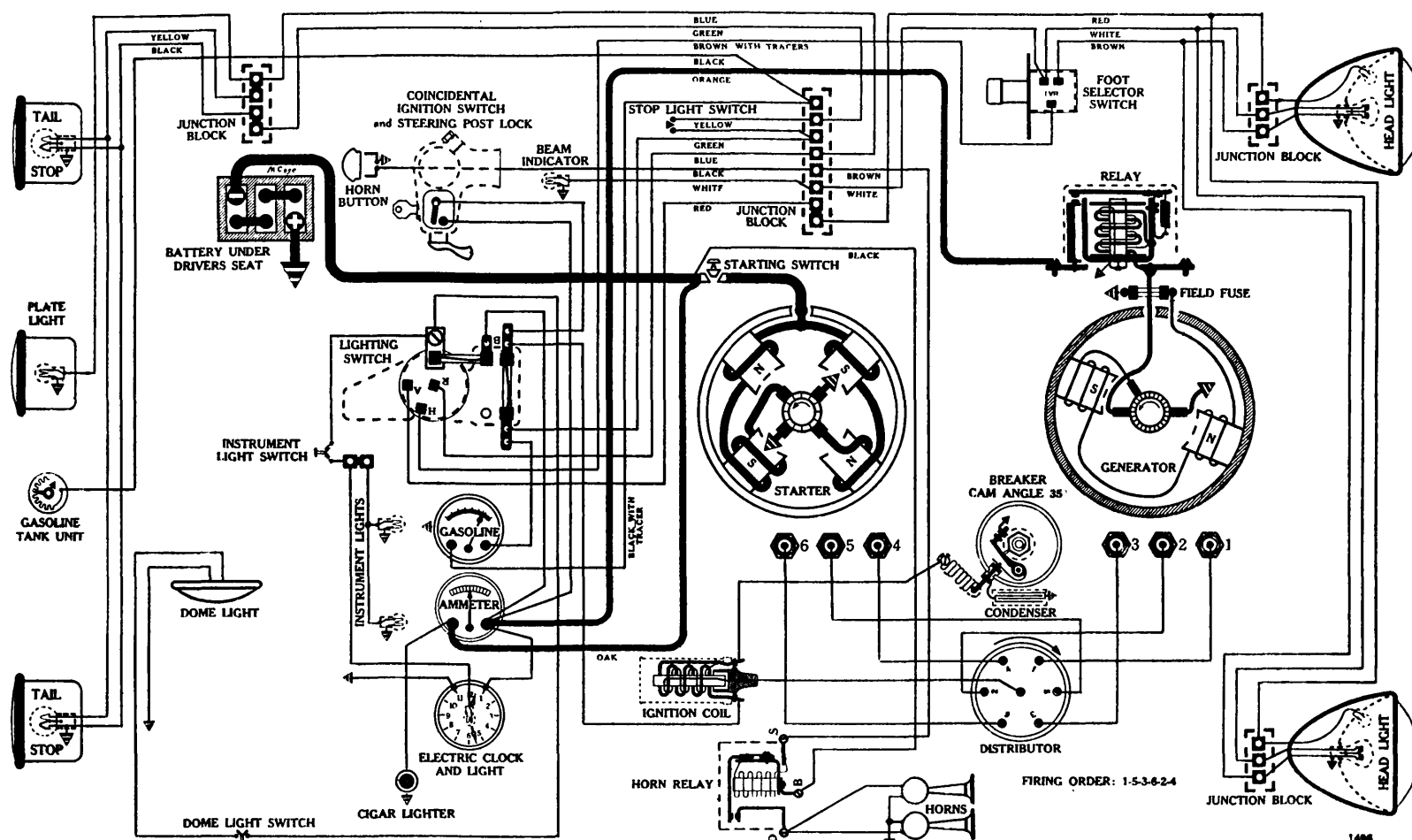
Foot Selector Switch—R.B.M. Mfg. Co., No. 2450.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2330; PARK—55; INSTRUMENT—63;
DOME—81; STOP AND TAIL—1158.

NASH-LAFAYETTE

Model 3710, Series 400, 6 cyl., (1937)

Engine {Bor 3-3/8
Stroke 4-3/8



BATTERY

U.S.L., KL-1-13, 6 volts. Positive Terminal Grounded
Starting Capacity—120 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—
3.1
Lighting Capacity—5 amps. for 20 hours (100 amp.
hour).
Case—Length, 9; width, 7-1/16; height, 9 1/8 inches.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End
Auto-Lite, MAB-4076

Connection to Engine—Bendix Drive, Type
LCD11FX-10.

Running Frame—60 amps. at 5 1/2 volts, 3700 R.P.M.

Cranking Engine—140 amps. at 5.4 volts.

Engine Cranking Speed—132 R.P.M.

Stall Data (on car)—400 amps. at 3.8 volts.

Lock Torque (for test bench use)—15 1/2 pound-feet,
582 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new
brushes).

Starting Switch—Auto-Lite, SW-4005, mounted on sub-
frame, operated by fully depressing clutch pedal.

Armature—Auto-Lite, MAB-2057.

IGNITION

Rotation, R. H., Top View

Auto-Lite, IGW-4010

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 35 degrees; open 25 de-
grees.

Contact Spring Tension—18 to 20 oz.

Timing—Exact top dead center. Slowly turn engine
until No. 1 piston is coming up on compression stroke.
Stop when mark "DC" on front vibration dampener
is directly under pointer on timing chain cover. With
rotor under No. 1 Dist. Cap Terminal, breaker points
should just open.

Spark Plugs—14-MM (AC type K-7); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—12 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
550.....	275.....	Start
656.....	328.....	2
768.....	384.....	4
880.....	440.....	6
900 (Intermediate)	450.....	6 1/2
1200.....	600.....	8
1600.....	800.....	10
2000 (Max.)	1000.....	12

Ignition Coil—A-L, IG-4407.

Ignition Switch—Oakes Steering Post and Ignition
Lock, No. 301545.

GENERATORS

Rotation, L. H., Com. End

Auto-Lite, GCM-4803-4 or GCO-4802

NOTE:—Following data for the GCM-4803-4 genera-
tor. If GCO-4802 with VRB-4002-D Vibrating-Point
Current and Voltage Regulator, refer to 1937 Nash,
Model 3720 for data.

NASH-LAFAYETTE

Mod 1 3710, S ri s 400, 6 cyl., (1937)

Performanc Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	750.....	6.3
2.....	810.....	6.5
4.....	870.....	6.7
6.....	935.....	6.9
8.....	1010.....	7.1
10.....	1090.....	7.25
12.....	1190.....	7.45
14.....	1295.....	7.65
16.....	1420.....	7.85
18.....	1560.....	8.0
20.....	1750.....	8.2
22.....	2100 (Max.)	8.4

Motoring Freely—5.75 to 6.25 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5.1 volts.

Field Fuse—5 amps. (type 1A-5).

Field Test—3.50 to 3.89 amps. at 6 volts.

Brush Spring Tension—27 to 53 oz. on each (new brushes).

Armature—Auto-Lite, GCJ-2030.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4014

Points Close—6.5 to 7.25 volts.

Points Open—.5 to 3.0 amps. discharge.

Contact Gap—.015 inch minimum (points open).

Armature Air Gap—.034 to .038 inch (points open).

LIGHTING

Switch—H. A. Douglas Mfg. Co., No. 5601-C.

Location—Behind instrument board.

Fuses—Two 20 amp. fuses (type 3A-20) mounted on switch back. The fuse which is parallel to instrument board protects the gasoline gauge and stop light circuits, and is alive only when ignition switch is "on."

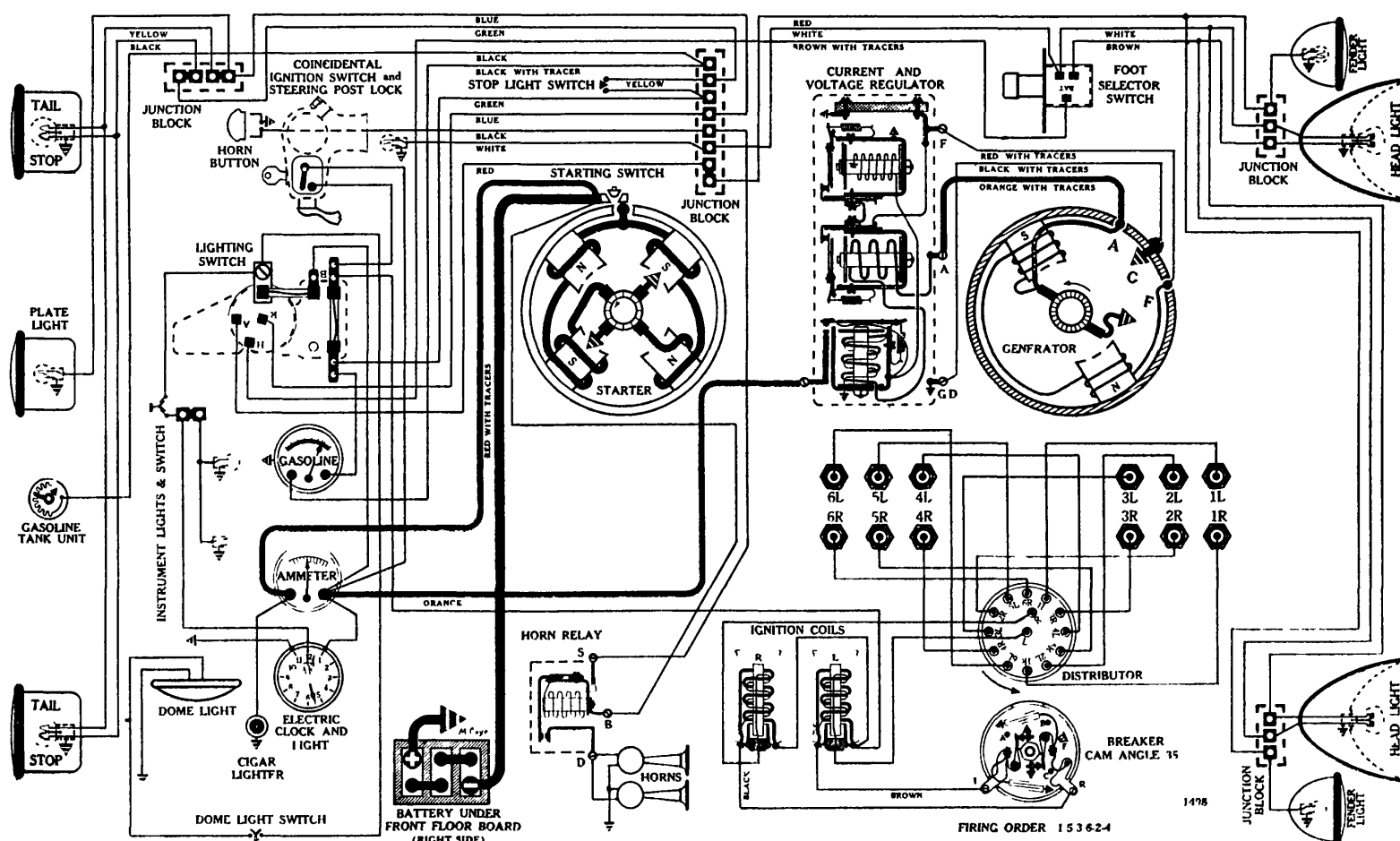
Foot Selector Switch—H. A. Douglas Mfg. Co., No. 5543.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2331; PARK—55; LICENSE PLATE—63;
INSTRUMENT—55; DOME—81; INDICATOR—55; STOP AND TAIL—1158.

NASH

 Engine { Bor 3-3/8
Stroke 4-3/8

Model 3720, Ambassador Twin Ign. Six, (1937)



BATTERY

U.S.L., KL-1-13, 6 volts. Positive Terminal Grounded
Starting Capacity—120 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1
Lighting Capacity—5 amps. for 20 hours (100 amp. hour).
Case—Length, 9; width, 7-1/16; height, 9 1/8 inches.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End
Auto-Lite, MAB-4076

Conn ction to Engine—Bendix Drive, Type LCD11FX-10.

Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.

Cranking Engine—140 amps. at 5.4 volts.

Engin Cranking Speed—132 R.P.M.

Stall Data (on car)—400 amps. at 3.8 volts.

Lock Torque (for test bench use)—15 1/2 pound-feet, 582 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-4005, mounted on sub-frame, operated by fully depressing clutch pedal.

Armature—Auto-Lite, MAB-2057.

IGNITION

A-L Test 477 Rotation, L. H., Top View

Auto-Lite, IGE-4012-B

(Full Automatic Spark Advance)

Break rs—Contact separation .020 inch on each.

Cam Angl s—Points closed 35 degrees; open 25 degrees.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Adjust both breakers to open simultaneously. Equal 60 degree intervals between interruptions.

Timing—4 degrees before top dead center. With No. 1 piston on compression stroke, slowly turn engine until the mark "Ign" (the first line) on front vibration dampener is directly under pointer on timing chain cover. With rotor ends under No. 1 Dist. Cap Terminals, both sets of breaker points should just open.

Spark Plugs—14-MM (AC type K-7); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—9 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400.....	200.....	Start
580.....	290.....	1
750.....	375.....	2
930.....	465.....	3
1110.....	555.....	4
1290.....	645.....	5
1460.....	730.....	6
1640.....	820.....	7
1820.....	910.....	8
2000 (Max.)	1000.....	9

Ignition Coils—Auto-Lite, CE-4402-A.

Ignition Switch—Oakes Steering Post and Ignition Lock, No. 301545.

GENERATORS

Rotation, L. H., Com. End

Auto-Lite, GCO-4802 or GCM-4803-4 (Bolt Drive)

NOTE—Following data for the GCO-4802 Generator, with VRB-4002-D Vibrating-Point Current and Voltage Regulator. If GCM-4803-4 generator with

NASH

Model 3720, Ambassador Twin Ign. Six, (1937)

CB-4014 Cut-Out Relay refer to 1937 Nash-Lafayette, Model 3710, Series 400, for data.

NOTE:—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating-point current and voltage regulators. The correct model regulator should be used when testing this generator. The following performance readings were taken with the voltage regulator points short-circuited together, and the maximum generator output controlled by the vibrating-point current regulator.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	925.....	6.1
2.....	982.....	6.28
4.....	1038.....	6.41
6.....	1090.....	6.6
8.....	1150.....	6.75
10.....	1200.....	6.91
12.....	1260.....	7.1
14.....	1315.....	7.25
16.....	1370.....	7.4
18.....	1425.....	7.6
20.....	1480.....	7.75
22.....	1535.....	7.91
24.....	1590.....	8.1
26.....	1645.....	8.25
28.....	1700 (Max.).....	8.4

Motoring Freely—3.94 to 4.36 amps. at 6 volts.

Max. Stall Current—30 to 34 amps. at 5 volts.

Field Test—1.47 to 1.63 amps. at 6 volts.

Brush Spring Tension—27 to 53 oz. (new brushes).

Armature—Auto-Lite, GCO-2031-F.

Charging Adjustment—No third brush. External vibrating-point current and voltage regulation.

RELAY-REGULATORS

Auto-Lite VRB-4002-D with TC-51L Field Resistance Unit. Maximum current capacity 28 amperes

A combination Cut-Out Relay, Vibrating-Point Current, and Vibrating-Point Voltage Regulator. Complete instructions for testing and servicing Regulators of

this type, together with trouble shooting charts, will be found in the Technical Section of this Manual under the "Generator Charge Regulator" classification.

Cut-Out Relay—**Points Close**—6.5 to 7.25 volts.
Points Open—.5 to 3.0 amps. discharge.
Contact Gap—.015 inch minimum (points open).
Armature Air Gap—.034 to .038 inch (points open).

Current Regulator—**Contact Spring Tension**—24 oz.
Gap Between Cor and Under Sid of Armature—.060 to .062 inch (when points just open).
Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).
Ampere Setting—28 amps. maximum (70° F.).

Voltage Regulator—**Contact Spring Tension**—24 oz.
Gap Between Core and Under Sid of Armature—.060 to .062 inch (when points just open).
Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).
Voltage Setting—7.4 to 7.9 (70° F.).

LIGHTING

Switch—H. A. Douglas Mfg. Co., No. 5601-C.

Location—Behind instrument board.

Fuses—Two 20 amp. fuses (type 3A-20) mounted on switch back. The fuse which is parallel to instrument board protects the gasoline gauge and stop light circuits, and is alive only when ignition switch is "on."

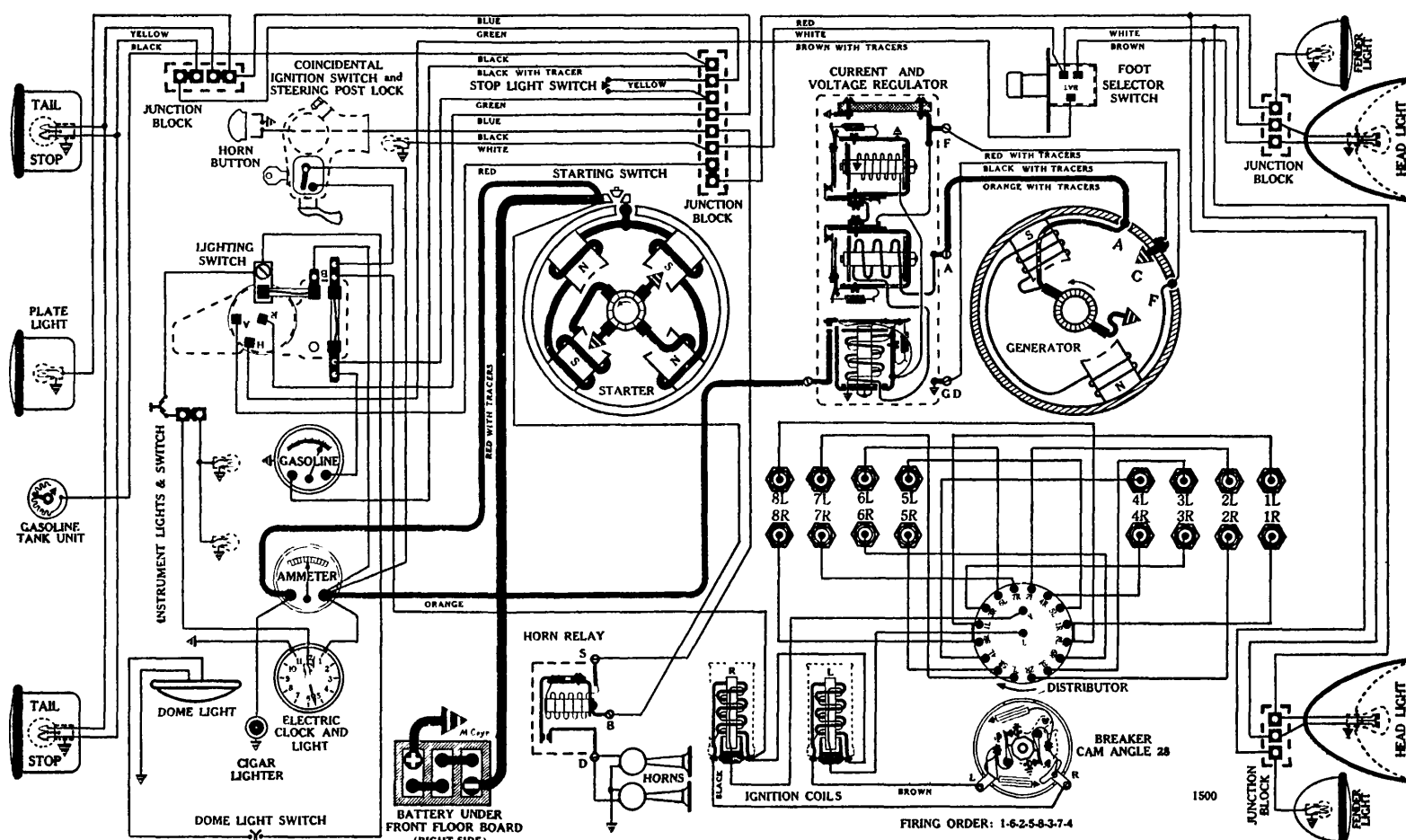
Foot Selector Switch—H. A. Douglas Mfg. Co., No. 5543.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2331; **PARK**—55; **LICENSE PLATE**—63;
INSTRUMENT—55; **DOME**—81; **INDICATOR**—55; **STOP AND TAIL**—1158.

NASH

Engine { Bore 3-1/8
Stroke 4-1/4

Mod 1 3780, Ambassador Twin Ign. Straight Eight, (1937)



BATTERY

U.S.L., KW-15A, 6 volts. Positive Terminal Grounded

Starting Capacity—140 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—4.

Lighting Capacity—5.8 amps. for 20 hours (116 amp. hour).

Case—Length, 10 1/4; width, 7-1/16; height, 9 1/8 inches.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End

Auto-Lite, MAB-4054

Connection to Engine—Bendix Drive, Type LCD11FX-10.

Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.

Cranking Engine—160 amps. at 4.9 volts.

Engine Cranking Speed—108 R.P.M.

Stall Data (on car)—420 amps. at 3.8 volts.

Lock Torque (for test bench use)—15 1/2 pound-feet, 582 amps. at 3 volts.

Brush Spring Tension—44 to 56 oz. on each (new brushes).

Starting Switch—Auto-Lite, VC-4003 (vacuum controlled, clutch pedal operated).

Armature—Auto-Lite, MAB-2047.

IGNITION

A-L Test 391 Rotation, R. H., Top View

Auto-Lite, IKG-4101

(Full Automatic Spark Advance)

Breakers—Contact separation .018 inch on each.

Cam Angles—Points closed 28 degrees; open 17 degrees.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Adjust both breakers to open simultaneously. Equal 45 degree intervals between interruptions.

Timing—9 degrees before top dead center. With No. 1 piston on compression stroke, slowly turn engine until the mark "Ign" (the first line) on front vibration dampener is directly under pointer on timing chain cover. With rotor ends under No. 1 Dist. Cap Terminals, both sets of breaker points should just open.

Spark Plugs—14-MM (AC type K-7); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
400.....	200.....	Start
620.....	310.....	2
830.....	415.....	4
1040.....	520.....	6
1260.....	630.....	8
1480.....	740.....	10
1680.....	840.....	12
1900.....	950.....	14
2000 (Max.).....	1000.....	15

Ignition Coils—Auto-Lite, CE-4402-A.

Ignition Switch—Oakes Steering Post and Ignition Lock, No. 301550.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GCO-4802 (Bolt Drive)

NOTE—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating-point current and voltage regulators. The correct model regulator should be used when testing this generator. The following

NASH

Mod 1 3780, Ambassador Twin Ign. Straight Eight, (1937)

performance readings were taken with the voltage regulator points short-circuited together, and the maximum generator output controlled by the vibrating-point current regulator.

Performance Data—Gen. cold

Amps.	R.P.M.	Volts
0.....	925.....	6.1
2.....	982.....	6.28
4.....	1038.....	6.41
6.....	1090.....	6.6
8.....	1150.....	6.75
10.....	1200.....	6.91
12.....	1260.....	7.1
14.....	1315.....	7.25
16.....	1370.....	7.4
18.....	1425.....	7.6
20.....	1480.....	7.75
22.....	1535.....	7.91
24.....	1590.....	8.1
26.....	1645.....	8.25
28.....	1700 (Max.)	8.4

Motoring Freely—3.94 to 4.36 amps. at 6 volts.

Max. Stall Current—30 to 34 amps. at 5 volts.

Field Test—1.47 to 1.63 amps. at 6 volts.

Brush Spring Tension—27 to 53 oz. (new brushes).

Armature—Auto-Lite, GCO-2031-F.

Charging Adjustment—No third brush. External vibrating-point current and voltage regulation.

RELAY-REGULATORS

Auto-Lite VRB-4002-D with TC-51L Field Resistance Unit. Maximum current capacity 28 amperes

A combination Cut-Out Relay, Vibrating-Point Current, and Vibrating-Point Voltage Regulator. Complete instructions for testing and servicing Regulators of this type, together with trouble shooting charts, will be found in the Technical Section of this Manual under the "Generator Charge Regulator" classification.

- Cut-Out Relay—** **Points Close**—6.5 to 7.25 volts.
Points Open—.5 to 3.0 amps. discharge.
Contact Gap—.015 inch minimum (points open).
Armature Air Gap—.034 to .038 inch (points open).
- Current Regulator—** **Contact Spring Tension**—24 oz.
Gap Between Cor and Under Side of Armature—.060 to .062 inch (when points just open).
Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).
Ampere Setting—28 amps. maximum (70° F.).
- Voltage Regulator—** **Contact Spring Tension**—24 oz.
Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).
Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).
Voltage Setting—7.4 to 7.9 (70° F.).

LIGHTING

Switch—H. A. Douglas Mfg. Co., No. 5601-C.

Location—Behind instrument board.

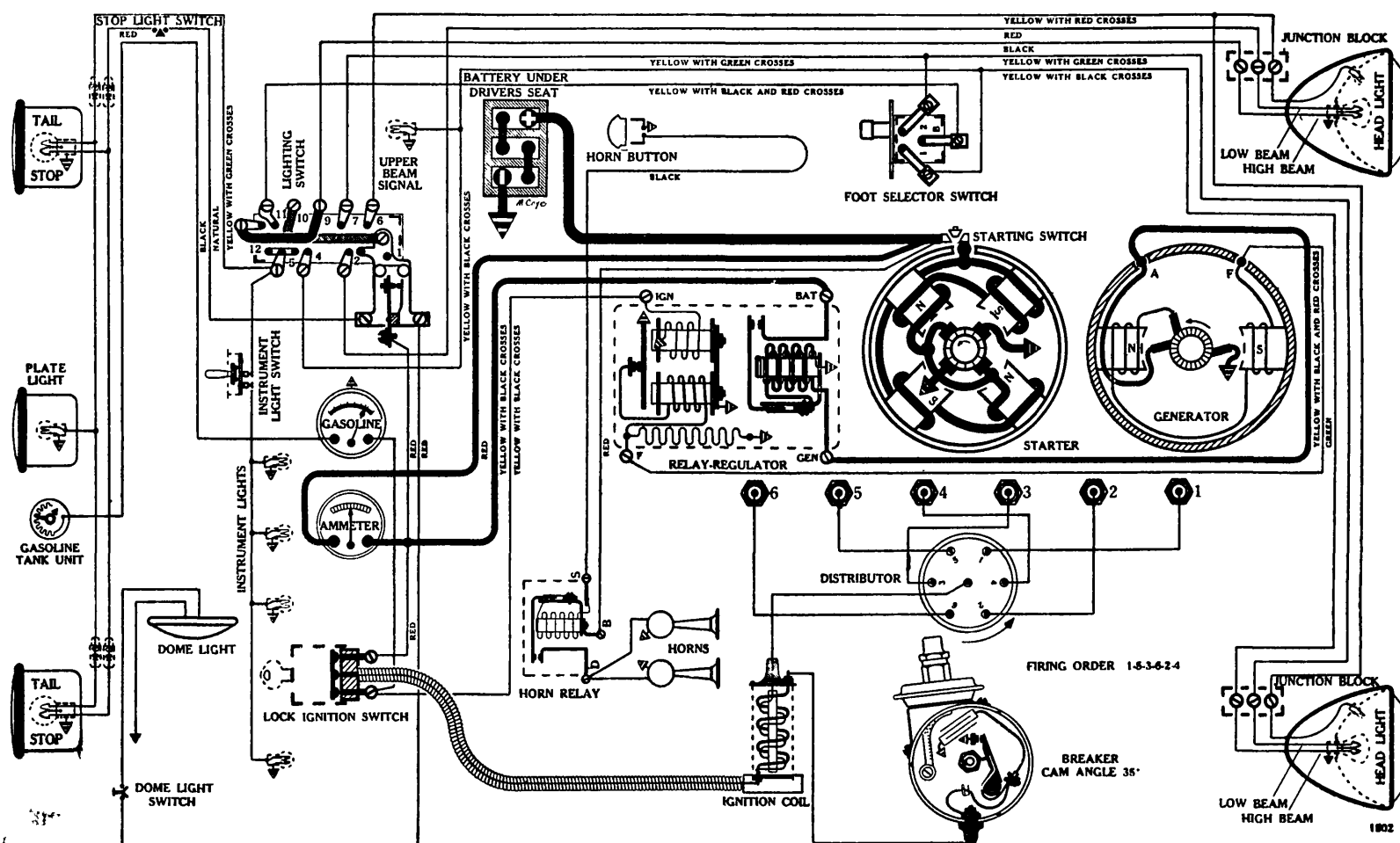
Fuses—Two 20 amp. fuses (type 3A-20) mounted on switch back. The fuse which is parallel to instrument board protects the gasoline gauge and stop light circuits, and is alive only when ignition switch is "on."

Foot Selector Switch—H. A. Douglas Mfg. Co., No. 5543.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2331; **PARK**—55; **LICENSE PLATE**—63;
INSTRUMENT—55; **DOME**—81; **INDICATOR**—55; **STOP AND TAIL**—1158.

OLDSMOBILE

Mod 1 F-37, 6 cyl., (1937)

Engine { Bor 3-7/16
Strok 4-1/8**BATTERY**

Delco-Remy, 15-T, 6 volts. Negative Terminal Grounded

Starting Capacity—115 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.3

Lighting Capacity—4.7 amps. for 20 hours (94 amp. hour).

Case—Length, 8-15/16; width, 7; height, 8-11/16 inches.

STARTER

D-R Test 368 Rotation, L. H., Com. End Group 51
Delco-Remy, 739-G

Connection to Engine—Mechanical gear shift, incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Start r Pinion and Clutch Assembly—Delco-Remy, 1843041.

Number Teeth on Pinion—9.

Number Teeth on Flywheel—145.

Cranking Ratio—16.1 to 1.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—130 amps. at 5.2 volts.

Engine Cranking Speed—108 R.P.M.

Stall Data (on car)—330 amps. at 3.8 volts.

Lock Torque (for test bench us)—12 pound-feet, 475 amps. at 3.63 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test 141 Rotation, L. H., Top View Group 81
Delco-Remy, 647-F

(Full Automatic Spark Advance in conjunction with Delco-Remy 681-P Vacuum Advance Unit, which controls position of Breaker Plate).

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 35 degrees; open 25 degrees.

Contact Spring Tension—17 to 21 oz.

Distributor Quadrant—Before timing ignition loosen hold-down plate bolt on back of distributor, and set pointer in line with "0" graduation on scale.

Timing—Exact top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the steel ball, pressed into flywheel (located at exact T.D.C.) registers with pointed screw at the timing hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-9); Gap .040 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Advance Unit (Delco-Remy, 681-P; Test No. 1908)—11 degrees (Dist. advance). Starts with vacuum of from 5 to 7 inches of mercury. Requires vacuum of from 15½ to 18½ for full travel.

Vacuum Advance Table (Delco-Remy 681-P Vacuum Control).

Inches of Mercury	Degrees Dist. Advance
6.	Start
7.	1
8.	2
9.	3
10.	4
11.	5
12.	6

OLDSMOBILE

Model F-37, 6 cyl., (1937)

13.	7
14.	8
15.	9
16.	10
17.	11 (Max.)

Automatic Advance—14 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
200.....	100.....	Start
600.....	300.....	2
800 (Intermediate)	400.....	3
1074.....	537.....	4
1622.....	811.....	6
2170.....	1085.....	8
2714.....	1357.....	10
3260.....	1630.....	12
3800 (Max.)	1900.....	14

Condenser—Delco-Remy, 1865972. Capacity .2 to .25 (mfds.).

Ignition Coil—Delco-Remy, 540-P. Amperage draw 4½ (engine stopped); 2½ (engine idling).

Ignition Switch and Cable—Delco-Remy, 435-M.

GENERATORS

Rotation, L. H., Com. End

Three different Generators used

Delco-Remy, 918-H, 936-T and Model 1100002

Delco-Remy, 918-H, (Belt Drive)

D-R Test 1632 **Group 35-A**

NOTE:—This is a two pole split field generator. One pole carries a third brush field winding, while the other pole has a straight shunt field winding. The grounding end of both windings is connected to a voltage regulator, thru the generator "F" terminal. In testing generators of this type ground the "F" terminal and operate them without the voltage regulator. Internal circuits of this generator are shown on page 1504.

Performance Data—Gen. cold. Generator "F" terminal grounded. No voltage regulation.

Amps.	R.P.M.	Volts
0.....	800.....	6.3
2.....	900.....	6.5
4.....	975.....	6.7
6.....	1050.....	6.9
8.....	1150.....	7.1
10.....	1235.....	7.3
12.....	1335.....	7.5
14.....	1475.....	7.6
16.....	1600.....	7.7
18.....	1760.....	7.8
20.....	1925.....	7.9
22.....	2180.....	8.0
24.....	2450.....	8.1
26.....	3100.....	8.3
27.....	4000 (Max.)	8.4

Motoring Freely—4.5 to 7 amps. at 6 volts.

Motoring R.P.M.—900 to 1000 R.P.M. at 6 volts.

Max. Stall Current—28 to 34 amps. at 5 volts.

Field Tests—Shunt Coil, 1.35 to 1.50 amps. at 6 volts.

Third Brush Coil, .83 to .88 amps. at 6 volts.

Total Field Amps., 2.0 to 2.3 amps. at 6 volts.

Field Resistance in Ohms at 75° F.—

Shunt Coil, 4 to 4.25 ohms.

Third Brush Coil, 6.6 to 7.1 ohms.

Brush Spring Tension—Main brushes, 22 to 26 oz.

Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1866789.

Armature End Play—.005 inch (maximum).

Third Brush—Fixed (no adjustment).

Charging Adjustment—External Vibrating-Point Voltage regulation.

D-R Test 1271 **Delco-Remy, 936-T**

Group 24

NOTE:—This model generator was used on both the six and eight cylinder Oldsmobiles in 1936. For data refer to 1936 pages.

Delco-Remy, Model 1100002

D-R Test 1645

Group 87

(A new type high output Generator, which will be used extensively on 1938 Model automobiles. Internal circuits of this generator are shown on page 1502).

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	820.....	5.9
2.....	900.....	6.1
4.....	970.....	6.35
6.....	1040.....	6.6
8.....	1115.....	6.8
10.....	1200.....	7.0
12.....	1280.....	7.3
14.....	1380.....	7.5
16.....	1490.....	7.75
18.....	1600.....	8.0
20.....	1730.....	8.0
22.....	1880.....	8.0
24.....	2080.....	8.0
26.....	2360.....	8.0
28.....	2900.....	8.0
30.....	3400 (Max.)	8.0

Motoring Freely—3½ to 4½ amps. at 6 volts.

Max. Stall Current—32 to 34 amps. at 5.2 volts.

Field Test—2.3 to 2.6 amps. at 6 volts.

Brush Spring Tension—Main brushes, 22 to 26 oz.

Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1866789.

Charging Adjustment—Fixed third brush. External Vibrating-Point Voltage regulation.

RELAY-REGULATOR

D-R Test 1294 **Delco-Remy, 5814**

A combination of Cut-Out Relay and Vibrating Voltage Regulator

For Data see page 1505.

LIGHTING

Switch—Delco-Remy, 480-P. A combination switch with overload lighting thermostat.

Location—Behind instrument board.

Overload Thermostat—Delco-Remy, 1866467. Contact points open within one minute at 38 amp. load (70° F.). Contacts remain closed with load of 25 amps. (70° F.).

Instrument Light Switch—Delco-Remy, 1416.

Horn Relay—Delco-Remy, 271-A.

Foot Selector Switch—Delco-Remy, 471-T.

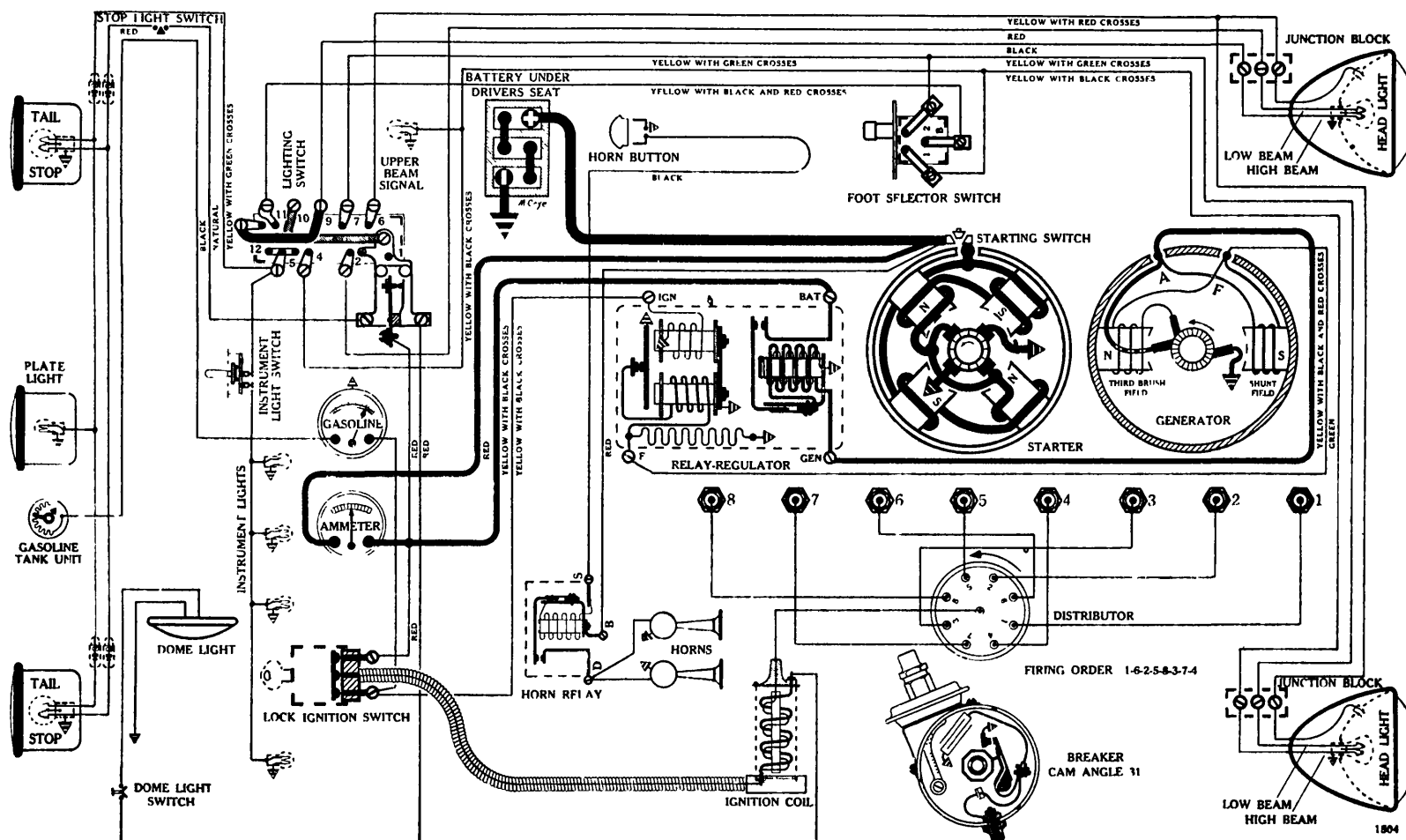
Lamps—Refer to "Lamp Data" in Technical Section. HEAD—2320; PARK—55; GLOVE COMPARTMENT—51; INSTRUMENT—55; BEAM INDICATOR—51; DOME—81; LICENSE PLATE—63; STOP AND TAIL—1154*.

*A new type bulb with indexed base to fit special socket. Can be inserted in correct position only.

OLDSMOBILE

M d l L-37, Straight Eight, (1937)

Engine { Bore 3-1/4
Strok 3-7/8



BATTERY

Delco-Remy, 17-K, 6 volts. Negative Terminal Grounded

Starting Capacity—131 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—4.4

Lighting Capacity—5.5 amps. for 20 hours (110 amp. hour).

Case—Length, 10 3/8; width, 7; height, 8 5/8 inches.

STARTER

Delco-Remy, 382 Rotation, L. H., Com. End Group 49
Delco-Remy, 729-J

Connection to Engine—Mechanical gear shift, incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor.

Starter Pinion and Clutch Assembly—Delco-Remy, 1843041.

Number Teeth on Pinion—9.

Number Teeth on Flywheel—145.

Cranking Ratio—16.1 to 1.

Running Frame—60 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—145 amps. at 5.0 volts.

Engine Cranking Speed—96 R.P.M.

Stall Data (on car)—380 amps. at 3.5 volts.

Lock Torque (for test bench use)—15 pound-feet, 600 amps. at 3.0 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test 142 Rotation, L. H., Top View Group 63
Delco-Remy, 663-W

(Full Automatic Spark Advance in conjunction with Delco-Remy 681-R Vacuum Advance Unit, which controls position of Breaker Plate).

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Distributor Quadrant—Before timing ignition loosen hold-down plate bolt on back of distributor, and set pointer in line with "0" graduation on scale.

Timing—3 degrees before top dead center. Slowly turn engine until No. 6 piston is coming up on compression stroke. Stop when the steel ball pressed into the flywheel, registers with pointed screw at the timing hole. With rotor under No. 6 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (AC type K-9); Gap .030 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance Unit (Delco-Remy 681-R; Test No. 1906)—8 1/2 degrees (Dist. advance). Starts with vacuum of from 5 to 7 inches of mercury. Requires vacuum of from 14 to 17 inches for full travel.

Vacuum Advance Table (Delco-Remy, 681-R Vacuum Control).

Inches of Mercury	Degrees Dist. Advance
6.	Start
7.12	1
8.24	2
9.36	3
10.48	4
11.60	5
12.72	6
13.84	7
14.96	8
15.50	8 1/2 (Max.)

OLDSMOBILE

Model L-37, Straight Eight, (1937)

Automatic Advance—15 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
380.....	190.....	Start
730.....	365.....	2
1000 (Intermediate)	500.....	3½
1130.....	565.....	4
1650.....	825.....	6
2170.....	1085.....	8
2700.....	1350.....	10
3220.....	1610.....	12
3740.....	1870.....	14
4000 (Max.)	2000.....	15

Condenser—Delco-Remy, 1865972. Capacity .2 to .25 (mfd.).

Ignition Coil—Delco-Remy, 539-P. Amperage draw 4½ (engine stopped); 2½ (engine idling).

Ignition Switch and Cable—Delco-Remy, 435-M.

GENERATORS

Rotation, L. H., Com. End

Three different Generators used

Delco-Remy, 918-H, 936-T and Model 1100002

Delco-Remy, 918-H, (Belt Drive)

D-R Test 1632

Group 35-A

NOTE—This is a two pole split field generator. One pole carries a third brush field winding, while the other pole has a straight shunt field winding. The grounding end of both windings is connected to a voltage regulator, thru the generator "F" terminal. In testing generators of this type ground the "F" terminal and operate them without the voltage regulator. Internal circuits of this generator are shown on page 1504.

Performance Data—Gen. cold. Generator "F" terminal grounded. No voltage regulation.

Amps.	R.P.M.	Volts
0.....	800.....	6.3
2.....	900.....	6.5
4.....	975.....	6.7
6.....	1050.....	6.9
8.....	1150.....	7.1
10.....	1235.....	7.3
12.....	1335.....	7.5
14.....	1475.....	7.6
16.....	1600.....	7.7
18.....	1760.....	7.8
20.....	1925.....	7.9
22.....	2180.....	8.0
24.....	2450.....	8.1
26.....	3100.....	8.3
27.....	4000 (Max.)	8.4

Motoring Freely—4.5 to 7 amps. at 6 volts.

Motoring R.P.M.—900 to 1000 R.P.M. at 6 volts.

Max. Stall Current—28 to 34 amps. at 5 volts.

Field Tests—Shunt Coil, 1.35 to 1.50 amps. at 6 volts.
Third Brush Coil, .83 to .88 amps. at 6 volts.

Total Field Amps., 2.0 to 2.3 amps. at 6 volts.

Field Resistance in Ohms at 75° F.—

Shunt Coil, 4 to 4.25 ohms.

Third Brush Coil, 6.6 to 7.1 ohms.

Brush Spring Tension—Main brushes, 22 to 26 oz.
Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1866789.

Armature End Play—.005 inch (maximum).

Third Brush—Fixed (no adjustment).

Charging Adjustment—External Vibrating-Point Voltage regulation.

D-R Test 1271 Delco-Remy, 936-T

Group 24

NOTE—This model generator was used on both the six and eight cylinder Oldsmobiles in 1936. For data refer to 1936 pages.

Delco-Remy, Model 1100002

D-R Test 1645

Group 87

(A new type high output Generator, which will be used extensively on 1938 Model automobiles. Internal circuits of this generator are shown on page 1502).

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	820.....	5.9
2.....	900.....	6.1
4.....	970.....	6.35
6.....	1040.....	6.6
8.....	1115.....	6.8
10.....	1200.....	7.0
12.....	1280.....	7.3
14.....	1380.....	7.5
16.....	1490.....	7.75
18.....	1600.....	8.0
20.....	1730.....	8.0
22.....	1880.....	8.0
24.....	2080.....	8.0
26.....	2360.....	8.0
28.....	2900.....	8.0
30.....	3400 (Max.)	8.0

Motoring Freely—3½ to 4½ amps. at 6 volts.

Max. Stall Current—32 to 34 amps. at 5.2 volts.

Field Test—2.3 to 2.3 amps. at 6 volts.

Brush Spring Tension—Main brushes, 22 to 26 oz.
Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1866789.

Charging Adjustment—Fixed third brush. External Vibrating-Point Voltage regulation.

RELAY-REGULATOR

D-R Test 1294 Delco-Remy, 5814

A combination of Cut-Out Relay and Vibrating Voltage Regulator

Cut-Out Relay—Closes—6.5 to 7.0 volts.
Opens—0 to 3 amps. discharge at 6.3 volts.

Contact Gap—.018 to .025 inch.

Core Gap—.018 to .022 inch, contacts closed.

Voltage Regulator—Contact Spring Tension—2.7 to 3.5 ounces (minimum).

Gap Between Fiber Bump r and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Circuit Voltage—This voltage regulator must be adjusted on a closed circuit only.

Voltage Setting—Regulator operates at 7.55 to 7.85 volts, with a generator charging rate of from 8 to 10 amps. (70° F.), and running between 2800 to 3000 R.P.M. Connect voltmeter between terminal marked "Ign." and ground.

LIGHTING

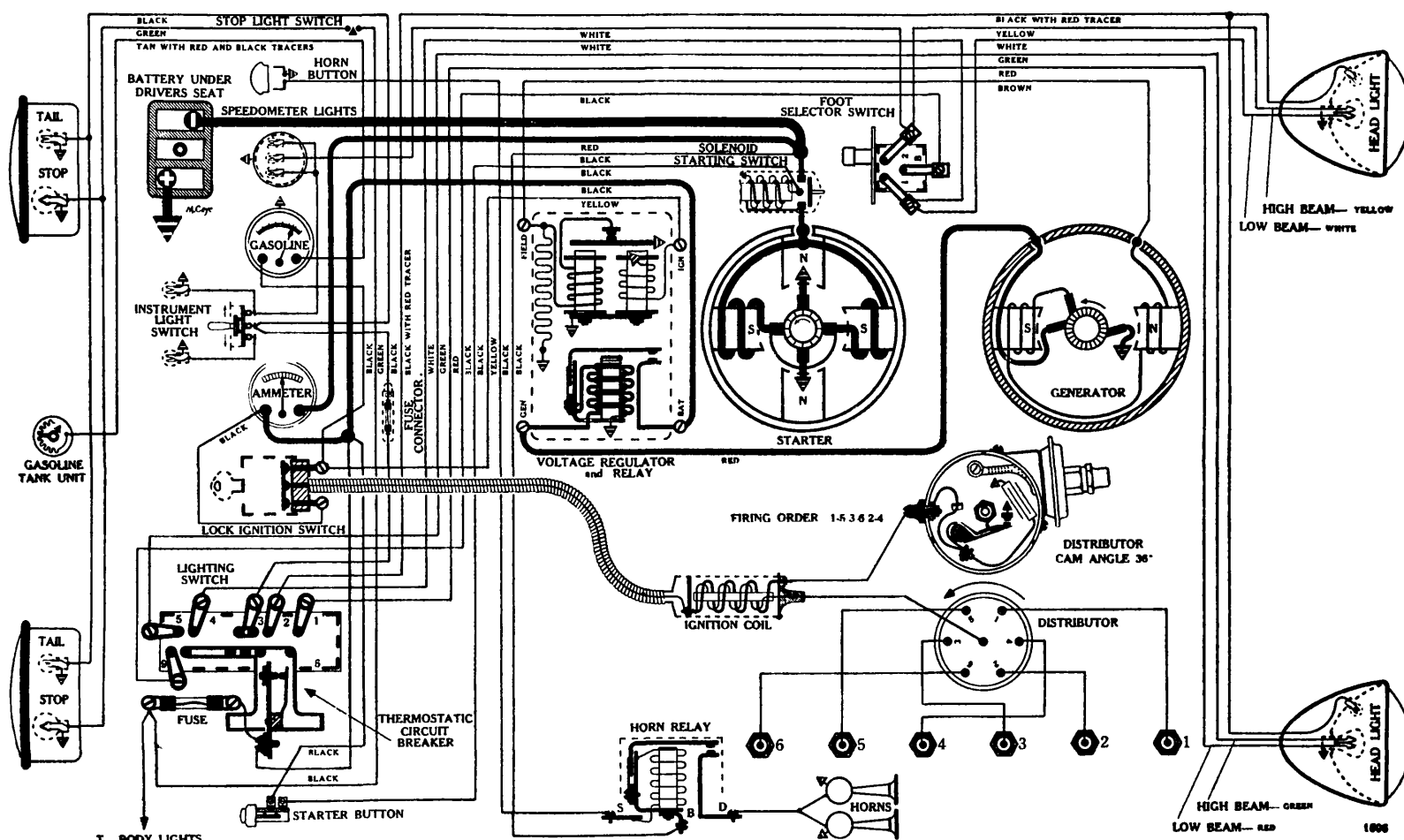
Switch—Delco-Remy, 480-P.

For Data see page 1503.

PACKARD

Series 115-C, 6 cyl., (1937)
DELCO-REMY EQUIPPED

Engine { Bore 3-7/16
Stroke 4-1/4



BATTERY

Willard, WT-1-95, 6 volts. Positive Terminal Grounded

Starting Capacity—119 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.1

Lighting Capacity—4.75 amps. for 20 hours (95 amp. hour).

Case—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

D-R T st 400-A Rotation, L. H., Com. End Group 51
Delco-Remy, 739-F

Connection to Engine—Bendix Drive, Type A-1718.

Running Free—65 amps. at 5 volts, 5000 R.P.M.

Cranking Engine—155 amps. at 5.2 volts.

Engin Cranking Speed—138 R.P.M.

Stall Data (on car)—390 amps. at 3.6 volts.

Lock Torque (for test bench use)—12 pound-feet, 475 amps. at 3.6 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1539.

Push Button Starting Control Switch—Delco-Remy, 1417.

Armature—Delco-Remy, 1866105.

IGNITION

D-R Test 138 Rotation, L. H., Top View Group 81
Delco-Remy, 647-E

(Full Automatic Spark Advance in conjunction with Delco-Remy, 681-K Vacuum Advance Unit, which controls position of Breaker Plate).

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 35 degrees; open 25 degrees.

NOTE:—Diagram shows 36 degrees cam angle, which was official up to June 1937. Delco-Remy Bulletin 1D-180 date 5-20-37 specifies 35 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—2 1/2 to 4 degrees before top dead center (cast iron heads); 4 to 6 degrees before top dead center (aluminum heads with compression ratio of 7 to 1). Set pointer of FUEL COMPENSATOR at "O" graduation on scale. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when leading edge of the white line on the flywheel, located 4 degrees before flywheel mark "#1UP'DC", aligns with pointer at the timing inspection hole found below the starting motor. (NOTE: Each graduation on the flywheel represents 2 degrees advance or retard.) If timing an engine with a high compression, aluminum head stop when the third graduation on the flywheel, located 6 degrees before flywheel mark "#1UP'DC", aligns with pointer. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—10-MM (AC or Champion types Y-4); Gap .026 to .030 inch.

IMPORTANT:—This is a new size spark plug and extremely small. Use special socket wrench with but a four inch handle for removing and replacing plugs of this type. Tightening leverage should not exceed 50 inch pounds or a pull of approximately 12 pounds exerted on end of special wrench.

Firing Order—1-5-3-6-2-4.

Vacuum Advance Unit (Delco-Remy, 681-K; T st No. 1902)—8 1/2 degrees (Dist. advance). Starts with vacuum of from 5 to 7 inches of mercury. Requires vacuum of 15 to 19 inches for full travel.

PACKARD

Series 115-C, 6 cyl., (1937)

DELCO-REMY EQUIPPED

Vacuum Advance Table (Delco-Remy 681-K Vacuum Control).

Inches of Mercury	Degrees Dist. Advance
6.	Start
7.30.....	1
8.60.....	2
9.90.....	3
11.20.....	4
12.50.....	5
13.80.....	6
15.10.....	7
16.40.....	8
17.00.....	8½ (Max.)

Automatic Advance—10¾ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
430.....	215.....	Start
890.....	445.....	2
1200 (Intermediate)	600.....	3¼
1450.....	725.....	4
2206.....	1103.....	6
2962.....	1481.....	8
3718.....	1859.....	10
4000 (Max.)	2000.....	10¾

Condenser—Delco-Remy, 1865972. Capacity .2 to .25 (mfds.).

Ignition Coil—Delco-Remy, 539-N. Amperage draw 4½ (engine stopped); 2½ (engine idling).

Ignition Switch and Cable—Delco-Remy, 435-L.

GENERATOR

D-R Test 1271 Rotation, L. H., Com. End Group 48
Delco-Remy, 948-U

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts
0.....	750.....	6.5
4.....	900.....	6.9
8.....	1100.....	7.3
12.....	1350.....	7.7
16.....	1750.....	8.1
22.....	3300 (Max.)	8.5

Motoring Freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5½ volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Charging Adjustment—Fixed third brush. External vibrating-point voltage regulation.

RELAY-REGULATOR

D-R Test 1294 Delco-Remy, 5812 or 5827

A combination of Cut-Out Relay and Vibrating Voltage Regulator

Cut-Out Relay—**Closes**—6.5 to 7.0 volts.
Opens—0 to 3 amps. discharge at 6.3 volts.

Contact Gap—.018 to .025 inch.

Core Gap—.018 to .022 inch, contacts closed.

Voltage Regulator—**Contact Spring Tension**—2.7 to 3.5 ounces (minimum).

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Circuit Voltage—This voltage regulator must be adjusted on a closed circuit only.

Voltage Setting—Regulator operates at 7.55 to 7.85 volts, with a generator charging rate of from 8 to 10 amps. (70° F.). When making this test operate generator at 2800 to 3000 R.P.M. Connect voltmeter between terminal marked "Ign" and ground.

LIGHTING

Switch—Delco-Remy, 480-L. A combination lighting switch with overload lighting thermostat and fuse.

Location—Behind instrument board.

Overload Thermostat—Contact points open within one minute at 38 amps. load (70° F.). Contacts remain closed with load of 25 amps. (70° F.).

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back to protect body lights and stop light circuits. Single 20 amp. fuse (type 3A-20) in fuse connector found on wire leading from No. 3 terminal on lighting switch to protect tail light circuit.

Foot Selector Switch—Delco-Remy, 471-T.

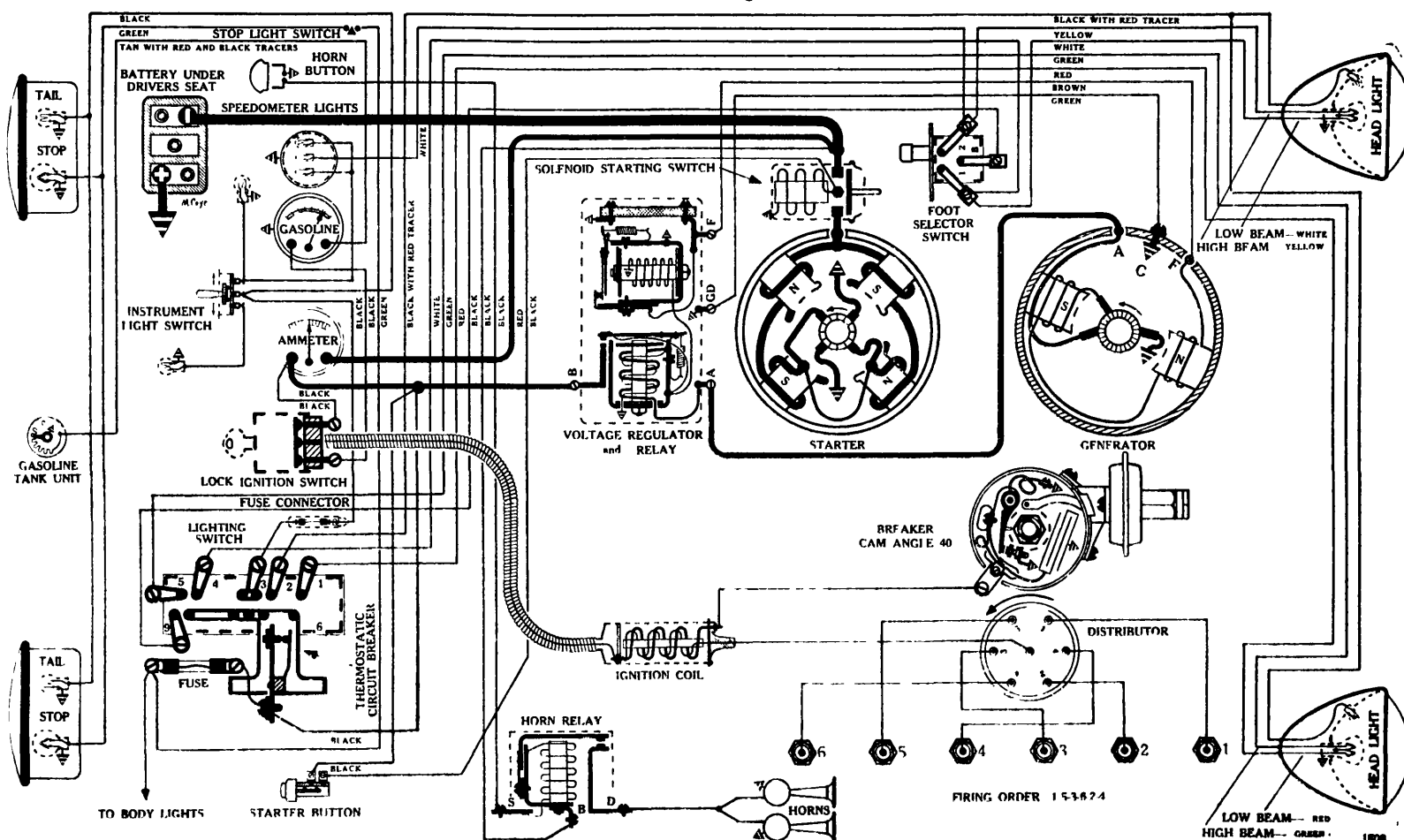
Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2330; PARK—55; FENDER (if used)—55;
INSTRUMENT BOARD GAUGE LIGHT—55; INSTRUMENT BOARD CLOCK LIGHT—51; INDICATOR—51; SPEEDOMETER—51; RADIO LIGHT—51; STOP—87; TAIL—63.

PACKARD

Series 115-C, 6 cyl., (1937)

AUTO-LITE EQUIPPED

Engine { **Bore 3-7/16**
Stroke 4-1/4



BATTERY

Willard, WT-1-95, 6 volts. Positive Terminal Grounded

Starting Capacity—119 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—
3.1

Lighting Capacity—4.75 amps. for 20 hours (95 amp. hour).

Case—Length, 9-1/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

**A-L T st CU-430 Rotation, L. H., Com. End
Auto-Lite, MAX-4006**

Connection to Engine—Bendix Drive, Type A-1729.

Running Fre —65 amps. at 5½ volts, 5300 R.P.M.

Cranking Engine—150 amps. at 5.3 volts.

Engine Cranking Speed—140 R.P.M.

Stall Data (on car)—410 amps. at 3.7 volts.

Lock Torque (for test bench use)—16½ pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—31 to 42 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4001.

Push Button Starting Control Switch—Delco-Remy, 1417.

Armature—Auto-Lite, MAW-2006.

IGNITION

**A-L Test 548 Rotation, L. H., Top Vi w
Auto-Lit , IGS-4011**

(Full Automatic Spark Advance in conjunction with Auto-Lite IGT-1028-BS Vacuum Chamb r. This chamb r controls position of Break r Plat Assembly

No. IGS-2044-B, which is stamped with the figure 7.5).

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 40 degrees; open 20 degrees.

Contact Spring Tension—18 to 20 oz.

Timing—2½ to 4 degrees before top dead center (cast iron heads) ; 4 to 6 degrees before top dead center (aluminum heads with compression ratio of 7 to 1). Set pointer of FUEL COMPENSATOR at "O" graduation on scale. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when leading edge of the white line on the flywheel, located 4 degrees before flywheel mark "#1UP'DC", aligns with pointer at the timing inspection hole found below the starting motor. (NOTE: Each graduation on the flywheel represents 2 degrees advance or retard.) If timing an engine with a high compression, aluminum head stop when the third graduation on the flywheel, located 6 degrees before flywheel mark "#1UP'DC", aligns with pointer. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—10-MM (AC or Champion types Y-4);
Gap .026 to .030 inch.

IMPORTANT:—This is a new size spark plug and extremely small. Use special socket wrench with but a four inch handle for removing and replacing plugs of this type. Tightening leverage should not exceed 50 inch pounds or a pull of approximately 12 pounds exerted on end of special wrench.

Firing Ord r—1-5-3-6-2-4.

Vacuum Chamber (Auto-Lite, IGT-1028-BS; Test No. 501)—7½ degrees (Dist. advance). Starts with

PACKARD

Series 115-C, 6 cyl., (1937)

AUTO-LITE EQUIPPED

vacuum of 6 inches of mercury. Requires vacuum of 17 inches for full travel.

Vacuum Advance Table (Auto-Lite, IGT-1028-BS Vacuum Chamber).

Inches of Mercury	Degrees Dist. Advance
6.	Start
7.47.....	1
8.94.....	2
10.41.....	3
11.88.....	4
13.35.....	5
14.82.....	6
16.29.....	7
17.	7½ (Max.)

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600.....	300.....	Start
1280.....	640.....	2
1960.....	980.....	4
2640.....	1320.....	6
3320.....	1660.....	8
4000 (Max.)	2000.....	10

Condenser—Auto-Lite, IG-2671-K. Capacity .20 to .25 (mfd.).

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CE-4627.

Ign. Coil Only—A-L, CE-3224-ES.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-DXS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GCJ-4801-A (Belt Drive)

NOTE:—This is an especially designed third brush current control generator, to be operated in conjunction with a vibrating-point voltage regulator. The following performance readings were taken with the generator field terminal grounded to the generator frame and the voltage regulator inoperative.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	825.....	6.2
2.....	870.....	6.38
4.....	915.....	6.55
6.....	960.....	6.7
8.....	1020.....	6.89
10.....	1075.....	7.05
12.....	1135.....	7.22
14.....	1200.....	7.38
16.....	1270.....	7.53
18.....	1340.....	7.7
20.....	1430.....	7.89
22.....	1545.....	8.05
24.....	1720.....	8.2
25.....	1850 (Max.)	8.3

Motoring Freely—4.0 to 4.4 amps. at 6 volts.

Max. Stall Current—28 to 30 amps. at 5.2 volts.

Field Test—1.9 to 2.1 amps. at 6 volts.

Brush Spring Tension—27 to 53 oz. (new brushes).

Armature—Auto-Lite, GCJ-2006.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers. In no case should third brush be adjusted nearer than 2 commutator bars to the insulated main brush. (2 to 2½ bars is approximately correct).

RELAY-REGULATOR

Auto-Lite VRD-4001-A with TC-51L Field Resistance Unit

A combination Cut-Out Relay and Vibrating-Point Voltage Regulator. Complete instructions for testing and servicing Regulators of this type, together with trouble shooting charts, will be found in the Technical Section of this Manual, under the "Generator Charge Regulator" classification.

Cut-Out Relay—
Points Close—6.5 to 7.25 volts.
Points Open—.5 to 3.0 amps. discharge.
Contact Gap—.015 inch minimum (points open).
Armature Air Gap—.034 to .038 inch (points open).

Voltage Regulator—
Contact Spring Tension—24 oz.
Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).
Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).
Voltage Setting—7.4 to 7.9 (70° F.).

LIGHTING

Switch—Delco-Remy, 480-L. A combination lighting switch with overload lighting thermostat and fuse.

Location—Behind instrument board.

Overload Thermostat—Contact points open within one minute at 38 amps. load (70° F.). Contacts remain closed with load of 25 amps. (70° F.).

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back to protect body lights and stop light circuits. Single 20 amp. fuse (type 3A-20) in fuse connector found on wire leading from No. 3 terminal on lighting switch to protect tail light circuit.

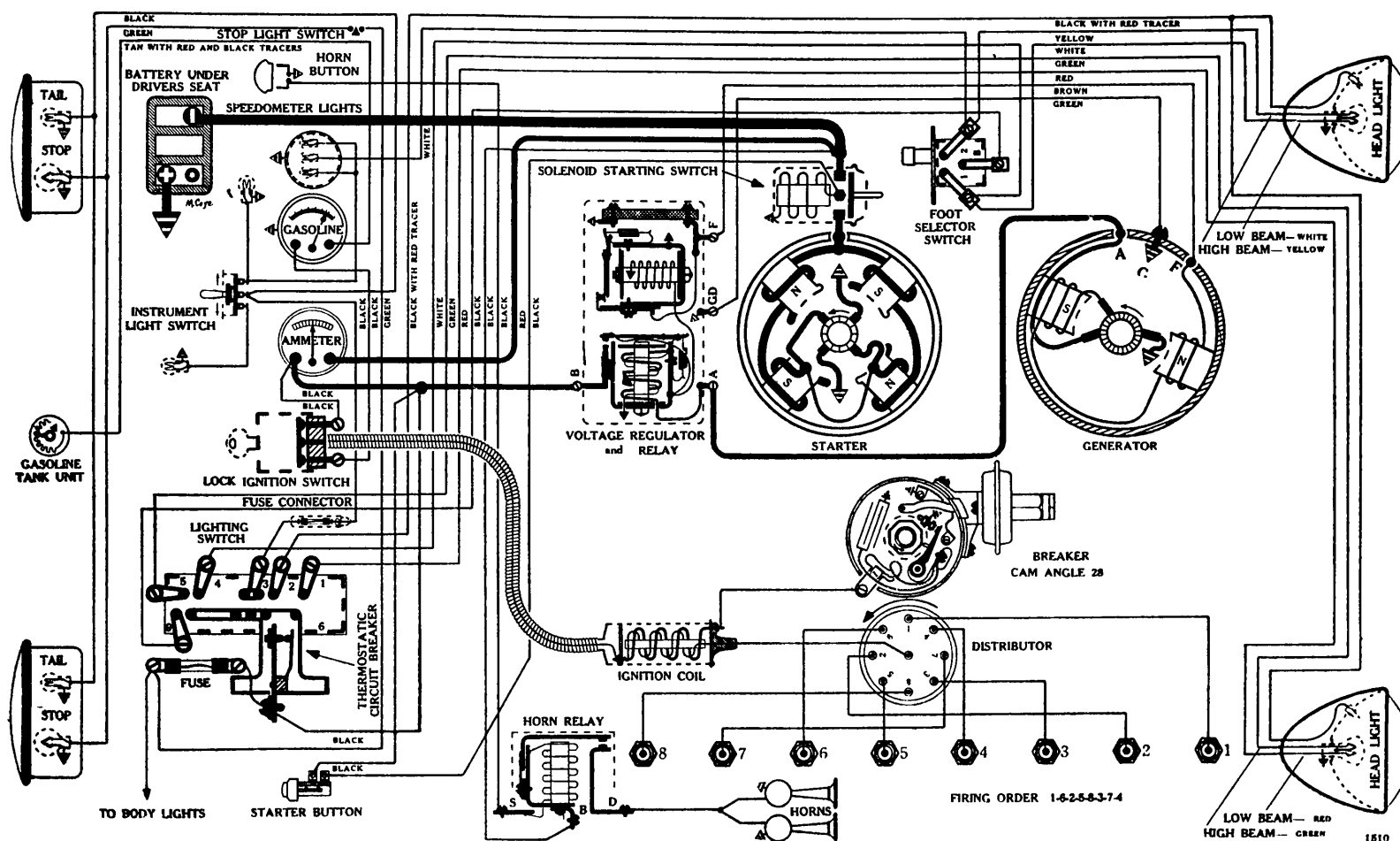
Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2330; **PARK**—55; **FENDER** (if used)—55;
INSTRUMENT BOARD GAUGE LIGHT—55; **INSTRUMENT BOARD CLOCK LIGHT**—51; **INDICATOR**—51; **SPEEDOMETER**—51; **RADIO LIGHT**—51; **STOP**—87; **TAIL**—63.

PACKARD

Series 120-C, 120-CD and 138-CD, Straight Eights, (1937)

Engine { Bore 3-1/4
Stroke 4-1/4



BATTERY

Pr st-O-Lite, "HiLevel", HP-2-17, 6 volts. Positive Terminal Grounded

IMPORTANT:—Prest-O-Lite "HiLevel" batteries are fully charged at a specific gravity of 1.250, providing the electrolyte is at a level with the star in the filler tube. The gravity of conventional batteries is between 1.275 and 1.280 under like conditions. Do not try to balance the electrolyte in "HiLevel" batteries in order to raise their gravity above 1.250.

Starting Capacity—133 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.5

Lighting Capacity—5.7 amps. for 20 hours (114 amp. hour).

Case—Length, 10-5/16; width, 7; height, 8 3/4 inches.

STARTER

A-L Test CU-430 Rotation, L. H., Com. End
Auto-Lite, MAX-4006

Connection to Engine—Bendix Drive, Type A-1729.

Running Free—65 amps. at 5 1/2 volts, 5300 R.P.M.

Cranking Engine—170 amps. at 5.3 volts.

Engine Cranking Speed—144 R.P.M.

Stall Data (on car)—450 amps. at 3.7 volts.

Lock Torque (for test bench use)—16 1/2 pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—31 to 42 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4001.

Push Button Starting Control Switch—Delco-Remy, 1417.

Armature—Auto-Lite, MAW-2006.

IGNITION

A-L Test 436 Rotation, L. H., Top View
Auto-Lite, IGT-4004

(Full Automatic Spark Advance in conjunction with Auto-Lite IGT-1028-BS Vacuum Chamber. This chamber controls position of Breaker Plate Assembly No. IGT-2030-A, which is stamped with the figure 7 1/2).

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 28 degrees; open 17 degrees.

Contact Spring Tension—18 to 20 oz.

Timing—7 degrees before top dead center (standard aluminum head); 4 degrees before top dead center (special aluminum head with compression ratio of 7 to 1. Set pointer of FUEL COMPENSATOR at "O" graduation on scale. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when leading edge of the white line on flywheel, located 7 degrees before mark "#1UP'DC" aligns with pointer at timing inspection hole, found below the starting motor.

NOTE:—Each graduation on flywheel represents 2 degrees advance or retard. If timing an engine with an aluminum head, stop when 2nd graduation on flywheel, located 4 degrees before "#1UP'DC", aligns with pointer.

Spark Plugs—10-MM (AC or Champion types Y-4); Gap .026 to .030 inch.

IMPORTANT:—This is a new size spark plug and extremely small. Use special socket wrench with but a four inch handle for removing and replacing plugs of this type. Tightening leverage should not exceed 50

PACKARD

Series 120-C, 120-CD and 138-CD, Straight Eights, (1937)

inch pounds or a pull of approximately 12 pounds exerted on end of special wrench.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Chamber (Auto-Lite, IGT-1028-BS; Test No. 501)—7½ degrees (Dist. advance). Starts with vacuum of 6 inches of mercury. Requires vacuum of 17 inches for full travel.

Vacuum Advance Table (Auto-Lite, IGT-1028-BS Vacuum Chamber).

Inches of Mercury	Degrees Dist. Advance
6.	Start
7.47.....	1
8.94.....	2
10.41.....	3
11.88.....	4
13.35.....	5
14.82.....	6
16.29.....	7
17.	7½ (Max.)

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600.....	300.....	Start
1360.....	680.....	2
2120.....	1060.....	4
2880.....	1440.....	6
3640.....	1820.....	8
4400 (Max.)	2200.....	10

Condenser—Auto-Lite, IG-2671-J. Capacity .20 to .25 (mfd.).

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CE-4623.

Ign. Coil Only—A-L, CE-3224-ES.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-DFS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GCJ-4801-A (Belt Drive)

NOTE—This is an especially designed third brush current control generator, to be operated in conjunction with a vibrating-point voltage regulator. The following performance readings were taken with the generator field terminal grounded to the generator frame and the voltage regulator inoperative.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	825.....	6.2
2.....	870.....	6.38
4.....	915.....	6.55
6.....	960.....	6.7
8.....	1020.....	6.89
10.....	1075.....	7.05
12.....	1135.....	7.22
14.....	1200.....	7.38
16.....	1270.....	7.53
18.....	1340.....	7.7
20.....	1430.....	7.89
22.....	1545.....	8.05
24.....	1720.....	8.2
25.....	1850 (Max.)	8.3

Motoring Freely—4.0 to 4.4 amps. at 6 volts.

Max. Stall Current—28 to 30 amps. at 5.2 volts.

Field Test—1.9 to 2.1 amps. at 6 volts.

Brush Spring Tension—27 to 53 oz. (new brushes).

Armature—Auto-Lite, GCJ-2006.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers. In no case should third brush be adjusted nearer than 2 commutator bars to the insulated main brush. (2 to 2½ bars is approximately correct).

RELAY-REGULATOR

Auto Lite VRD-4001-A with TC-51L Field Resistance Unit

A combination Cut-Out Relay and Vibrating-Point Voltage Regulator. Complete instructions for testing and servicing Regulators of this type, together with trouble shooting charts, will be found in the Technical Section of this Manual, under the "Generator Charge Regulator" classification.

Cut-Out Relay	Points Close —6.5 to 7.25 volts.
	Points Open —.5 to 3.0 amps. discharge.
	Contact Gap —.015 inch minimum (points open).
	Armature Air Gap —.034 to .038 inch (points open).
Voltage Regulator	Contact Spring Tension —24 oz.
	Gap Between Core and Under Side of Armature —.060 to .062 inch (when points just open).
	Contact Opening —.010 to .020 inch (with armature pressed down against stop pin).
	Voltage Setting —7.4 to 7.9 (70° F.).

LIGHTING

Switch—Delco-Remy, 480-L. A combination lighting switch with overload lighting thermostat and fuse.

Location—Behind instrument board.

Overload Thermostat—Contact points open within one minute at 38 amps. load (70° F.). Contacts remain closed with load of 25 amps. (70° F.).

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back to protect body lights and stop light circuits. Single 20 amp. fuse (type 3A-20) in fuse connector found on wire leading from No. 3 terminal on lighting switch to protect tail light circuit.

Foot Selector Switch—Delco-Remy, 471-T.

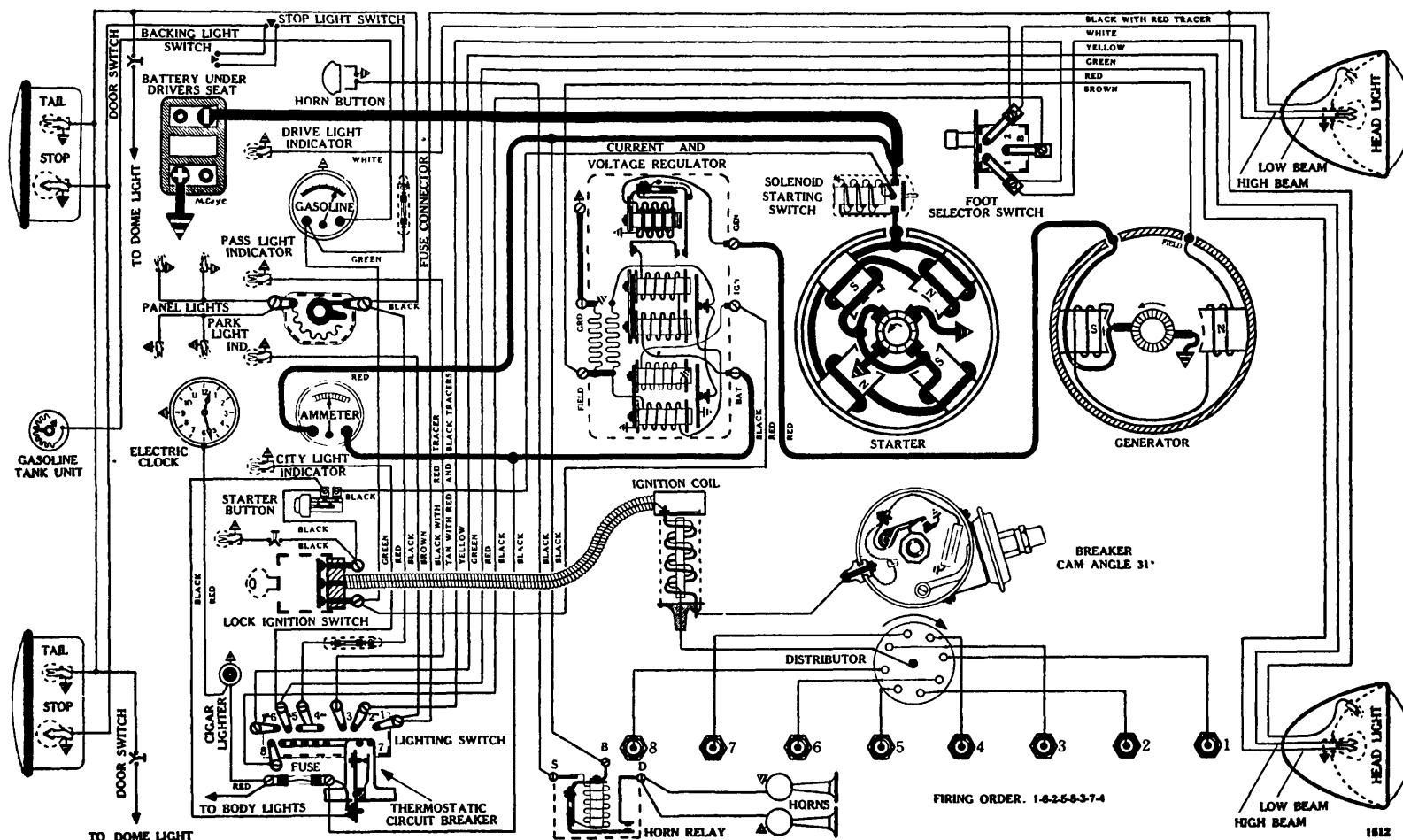
Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2330; **PARK**—55; **FENDER** (if used)—55; **INSTRUMENT BOARD GAUGE LIGHT**—55; **INSTRUMENT BOARD CLOCK LIGHT**—51; **INDICATOR**—51; **SPEEDOMETER**—51; **RADIO LIGHT**—51; **STOP**—87; **TAIL**—63.

PACKARD

Mod ls 1500, 1501, 1502, Sup r Straight Eights, (1937)

DELCO-REMY EQUIPPED

Engine { Bor 3-3/16
Strok 5



BATTERY

Prest-O-Lite "HiLevel", HR-4-21, 6 volts. Positive Terminal Grounded

IMPORTANT:—Prest-O-Lite "HiLevel" batteries are fully charged at a specific gravity of 1.250, providing the electrolyte is at a level with the star in the filler tube. The gravity of conventional batteries is between 1.275 and 1.280 under like conditions. Do not try to balance the electrolyte in "HiLevel" batteries in order to raise their gravity above 1.250.

Starting Capacity—175 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—6.3

Lighting Capacity—7.5 amps. for 20 hours (150 amp. hour).

Case—Length, 13; width, 7; height, 9 1/8 inches.

STARTER

D-R Test 372 Rotation, L. H., Com. End Group 49
Delco-Remy, 729-H

Connection to Engine—Bendix Drive, Type A-1729.

Running Free—60 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—165 amps. at 5.1 volts.

Engine Cranking Speed—130 R.P.M.

Stall Data (on car)—390 amps. at 3.8 volts.

Lock Torque (for test bench use)—16 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1540.

Push Button Starting Control Switch—Culver-Stearns.

Armature—Delco-Remy, 1866105.

IGNITION

D-R Test 139 Rotation, R. H., Top View Group 63
Delco-Remy, 663-L

(Full Automatic Spark Advance in conjunction with Delco-Remy, 681-L Vacuum Advance Unit, which controls position of Breaker Plate).

Breaker—Contact separation .015 inch.

Cam Angle—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—6 to 8 degrees before top dead center (cast iron heads); 4 to 5 1/2 degrees before top dead center (aluminum heads with compression ratio of 7 to 1). Set pointer of FUEL COMPENSATOR at "O" graduation on scale. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the 6th graduation ahead of mark "#1UP'DC" on front vibration dampener aligns with pointer on left front face of timing chain case cover. If timing an engine with a high compression aluminum head stop when the 4th graduation aligns with pointer. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—10-MM (AC or Champion types Y-4); Gap .026 to .030 inch.

IMPORTANT:—This is a new size spark plug and extremely small. Use special socket wrench with but a four inch handle for removing and replacing plugs of this type. Tightening leverage should not exceed 50 inch pounds or a pull of approximately 12 pounds exerted on end of special wrench.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance Unit (Delco-Remy, 681-L; Test No. 1903)—6 1/2 degrees (Dist. advance). Starts with vacuum of from 6 to 8 inches of mercury. Requires vacuum of 14 to 18 inches for full travel.

PACKARD

Mod ls 1500, 1501, 1502, Super Straight Eights, (1937)

DELCO-REMY EQUIPPED

Vacuum Advance Table (Delco-Remy, 681-L Vacuum Control).

Inches of Mercury	Degrees Dist. Advance
7.	Start
8.4	1
9.8	2
11.2	3
12.55	4
13.95	5
15.35	6
16.00	6½ (Max.)

Automatic Advance—9¾ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
320.....	160.....	Start
1076.....	538.....	2
1832.....	916.....	4
2588.....	1294.....	6
3344.....	1672.....	8
4000 (Max.)	2000.....	9¾

Condenser—Delco-Remy, 1866049.

Ignition Coil—Delco-Remy, 539-K. Amperage draw 4½ (engine stopped); 2½ (engine idling).

Ignition Switch and Cable—Delco-Remy, 430-L.

GENERATOR

D-R Test 1630 Rotation, L. H., Com. End Group 61
Delco-Remy, 961-J

NOTE:—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating-point current and voltage regulators. The regulator should be used when testing this generator. The following performance readings were taken with the voltage regulator points short-circuited together, and the maximum generator output controlled by the vibrating-point current regulator.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	675.....	6.40
2.....	730.....	6.50
4.....	780.....	6.65
6.....	835.....	6.80
8.....	890.....	6.90
10.....	950.....	7.05
12.....	1020.....	7.18
14.....	1090.....	7.30
16.....	1175.....	7.40
18.....	1260.....	7.55
20.....	1355.....	7.70
22.....	1460.....	7.80
24.....	1575.....	7.90
25.....	1650 (Max.)	8.00

Motoring Freely—3½ to 3¾ amps. at 6 volts, 450 R.P.M.

Max. Stall Current—26 to 28 amps. at 5 volts.

Field Test—2 to 2.2 amps. at 6 volts across field coils in series.

Brush Spring Tension—22 to 26 oz. on each (new brushes).

Armature—Delco-Remy, 1857866.

Charging Adjustment—No third brush. External vibrating-point current and voltage regulation.

RELAY-REGULATORS

D-R Test 1419 Delco-Remy, 5813

A combination Cut-Out Relay, Vibrating Current and Vibrating Voltage Regulators with Two Field Resistance Units. (D-R 1865615—inner; 1858018—outer Resistances).

Cut-Out Relay—Closes—6.5 to 7.0 volts.
Opens—0 to 3 amps. discharge at 6.3 volts.

Contact Gap—.018 to .025 inches.
Core Gap—.018 to .022 inches, contacts closed.

Current Regulator—Contact Spring Tension—3.5 oz. (minimum).

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.070 to .080 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Amperes Charge—24.0 to 26.0 at 70° F.

Voltage Regulator—[IMPORTANT! While making voltage regulator tests short circuit current regulator with jumper across contact points.

Contact Spring Tension—3.5 oz. (minimum).

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Circuit Voltage—This voltage regulator must be adjusted on a closed circuit only.

Voltage Setting—Regulator operates at 7.55 to 7.85 volts with a generator charging rate of from 8 to 10 amps. (70° F.) and running between 2800 to 3400 R.P.M. Connect voltmeter between terminal marked "Ign" and ground.

LIGHTING

Switch—Delco-Remy, 480-M. A combination lighting switch with overload lighting thermostat and fuse.

Location—Behind instrument board.

Overload Thermostat—Contact points open within one minute at 38 amps. load (70° F.). Contacts remain closed with load of 25 amps. (70° F.).

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back to protect body lights, cigar lighter and clock. Single 20 amp. fuse (type 3A-20) in fuse connector found on wire leading from No. 4 terminal on lighting switch to protect tail light circuit.

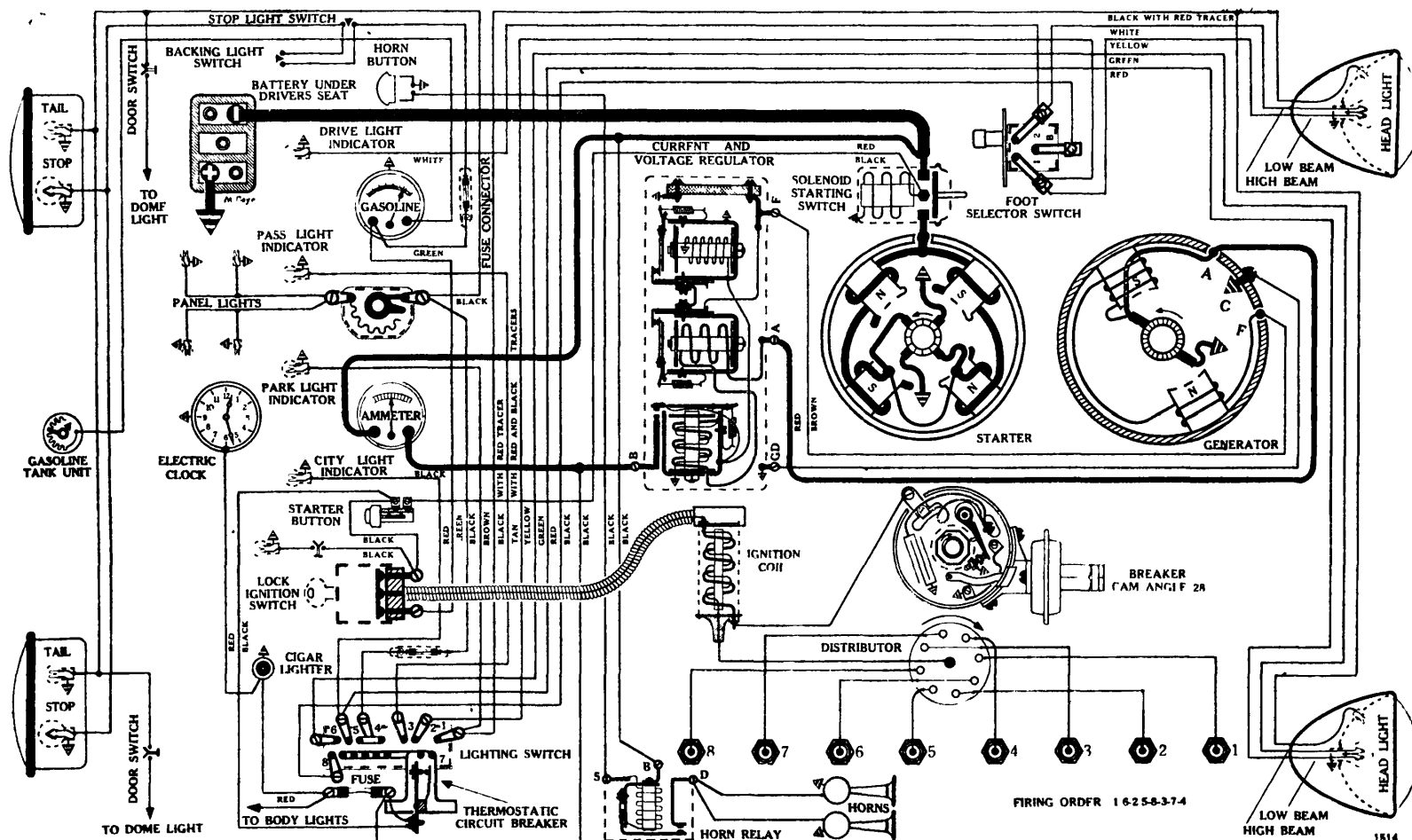
Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD (right)—2330; HEAD (left)—1104; PARK—55; FENDER (if used)—55; INSTRUMENT—63; READING—63; RADIO—51; INDICATOR—51; STOP—87; TAIL—63.

PACKARD

Models 1500, 1501, 1502, Sup r Straight Eights, (1937)

AUTO-LITE EQUIPPED

Engine {Bor 3-3/16
Strok 5

BATTERY

Pr st-O-Lite "HiLevel", HR-4-21, 6 volts. Positive Terminal Grounded

IMPORTANT:—Prest-O-Lite "HiLevel" batteries are fully charged at a specific gravity of 1.250, providing the electrolyte is at a level with the star in the filler tube. The gravity of conventional batteries is between 1.275 and 1.280 under like conditions. Do not try to balance the electrolyte in "HiLevel" batteries in order to raise their gravity above 1.250.

Starting Capacity—175 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—6.3

Lighting Capacity—7.5 amps. for 20 hours (150 amp. hour).

Case—Length, 13; width, 7; height, 9 1/8 inches.

STARTER

A-L Test CU-430 Rotation, L. H., Com. End
Auto-Lite, MAX-4014

Connection to Engine—Bendix Drive, Type A-1729.

Running Free—65 amps. at 5 1/2 volts, 5300 R.P.M.

Cranking Engine—155 amps. at 5.2 volts.

Engine Cranking Speed—120 R.P.M.

Stall Data (on car)—380 amps. at 3.9 volts.

Lock Torqu (for test bench use)—16 1/2 pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4001.

Push Button Starting Control Switch—Culver-Stearns.

Armature—Auto-Lite, MAW-2090.

IGNITION

A-L Test 535 Rotation, R. H., Top View
Auto-Lite, IGT-4005

(Full Automatic Spark Advance in conjunction with Auto-Lite IGT-1023-FS Vacuum Chamber. This chamber controls position of Breaker Plate Assembly No. IGT-2004-D, which is stamped with the figure 5.5).

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 28 degrees; open 17 degrees.

Contact Spring Tension—18 to 20 oz.

Timing—6 to 8 degrees before top dead center (cast iron heads); 4 to 5 1/2 degrees before top dead center (aluminum heads with compression ratio of 7 to 1). Set pointer of FUEL COMPENSATOR at "O" graduation on scale. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the 6th graduation ahead of mark "#1UP'DC" on front vibration dampener aligns with pointer on left front face of timing chain case cover. If timing an engine with a high compression aluminum head stop when the 4th graduation aligns with pointer. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—10-MM (AC or Champion types Y-4); Gap .026 to .030 inch.

IMPORTANT:—This is a new size spark plug and extremely small. Use special socket wrench with but a four inch handle for removing and replacing plugs of this type. Tightening leverage should not exceed 50 inch pounds or a pull of approximately 12 pounds exerted on end of special wrench.

Firing Order—1-6-2-5-8-3-7-4.

PACKARD

Models 1500, 1501, 1502, Super Straight Eights, (1937)

AUTO-LITE EQUIPPED

Vacuum Chamber (Auto-Lite, IGT-1023-FS; Test No. 550)—5½ degrees (Dist. advance). Starts with vacuum of 7 inches of mercury. Requires vacuum of 16 inches for full travel.

Vacuum Advance Table (Auto-Lite, IGT-1023-FS Vacuum Chamber).

Inches of Mercury	Degrees Dist. Advance
7.....	Start
8.63.....	1
10.26.....	2
11.89.....	3
13.52.....	4
15.15.....	5
16.....	5½ (Max.)

Automatic Advance—9 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600.....	300.....	Start
1268.....	634.....	2
1934.....	967.....	4
2600.....	1300.....	6
3268.....	1634.....	8
3600 (Max.).....	1800.....	9

Condenser—Auto-Lite, IG-2671-G. Capacity .20 to .25 (mfd.).

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CE-4026.

Ign. Coil Only—A-L, CE-3186-KS.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-207-B.

GENERATOR

Rotation, L. H., Com. End
Auto-Lite, GCO-4803-A

NOTE:—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating-point current and voltage regulators. The correct model regulator should be used when testing this generator. The following performance readings were taken with the voltage regulator points short-circuited together, and the maximum generator output controlled by the vibrating-point current regulator.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	780.....	6.3
2.....	850.....	6.48
4.....	925.....	6.6
6.....	1000.....	6.77
8.....	1070.....	6.9
10.....	1142.....	7.08
12.....	1218.....	7.21
14.....	1290.....	7.38
16.....	1362.....	7.51
18.....	1335.....	7.68
20.....	1510.....	7.81
22.....	1580.....	7.97
24.....	1655.....	8.11
26.....	1730.....	8.28
28.....	1800 (Max.).....	8.4

Motoring Freely—3.94 to 4.36 amps. at 6 volts.

Max. Stall Current—30 to 34 amps. at 5 volts.

Field Test—1.47 to 1.63 amps. at 6 volts.

Brush Spring Tension—27 to 53 oz. on each (new brushes).

Armature—Auto-Lite, GCO-2006-F.

Charging Adjustment—No third brush. External vibrating-point current and voltage regulation.

RELAY-REGULATORS

Auto-Lite VRB-4002-D with TC-51L Field Resistance Unit. Maximum current capacity 28 amperes.

A combination Cut-Out Relay, Vibrating-Point Current, and Vibrating-Point Voltage Regulator. Complete instructions for testing and servicing Regulators of this type, together with trouble shooting charts, will be found in the Technical Section of this Manual under the "Generator Charge Regulator" classification.

Cut-Out Relay—**Points Close**—6.5 to 7.25 volts.
Points Open—.5 to 3.0 amps. discharge.

Contact Gap—.015 inch minimum (points open).

Armature Air Gap—.034 to .038 inch (points open).

Current Regulator—**Contact Spring Tension**—24 oz.
Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).

Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).

Ampere Setting—28 amps. maximum (70° F.).

Voltage Regulator—**Contact Spring Tension**—24 oz.
Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).

Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).

Voltage Setting—7.4 to 7.9 (70° F.).

LIGHTING

Switch—Delco-Remy, 480-M. A combination lighting switch with overload lighting thermostat and fuse.

Location—Behind instrument board.

Overload Thermostat—Contact points open within one minute at 38 amps. load (70° F.). Contacts remain closed with load of 25 amps. (70° F.).

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back to protect body lights, cigar lighter and clock. Single 20 amp. fuse (type 3A-20) in fuse connector found on wire leading from No. 4 terminal on lighting switch to protect tail light circuit.

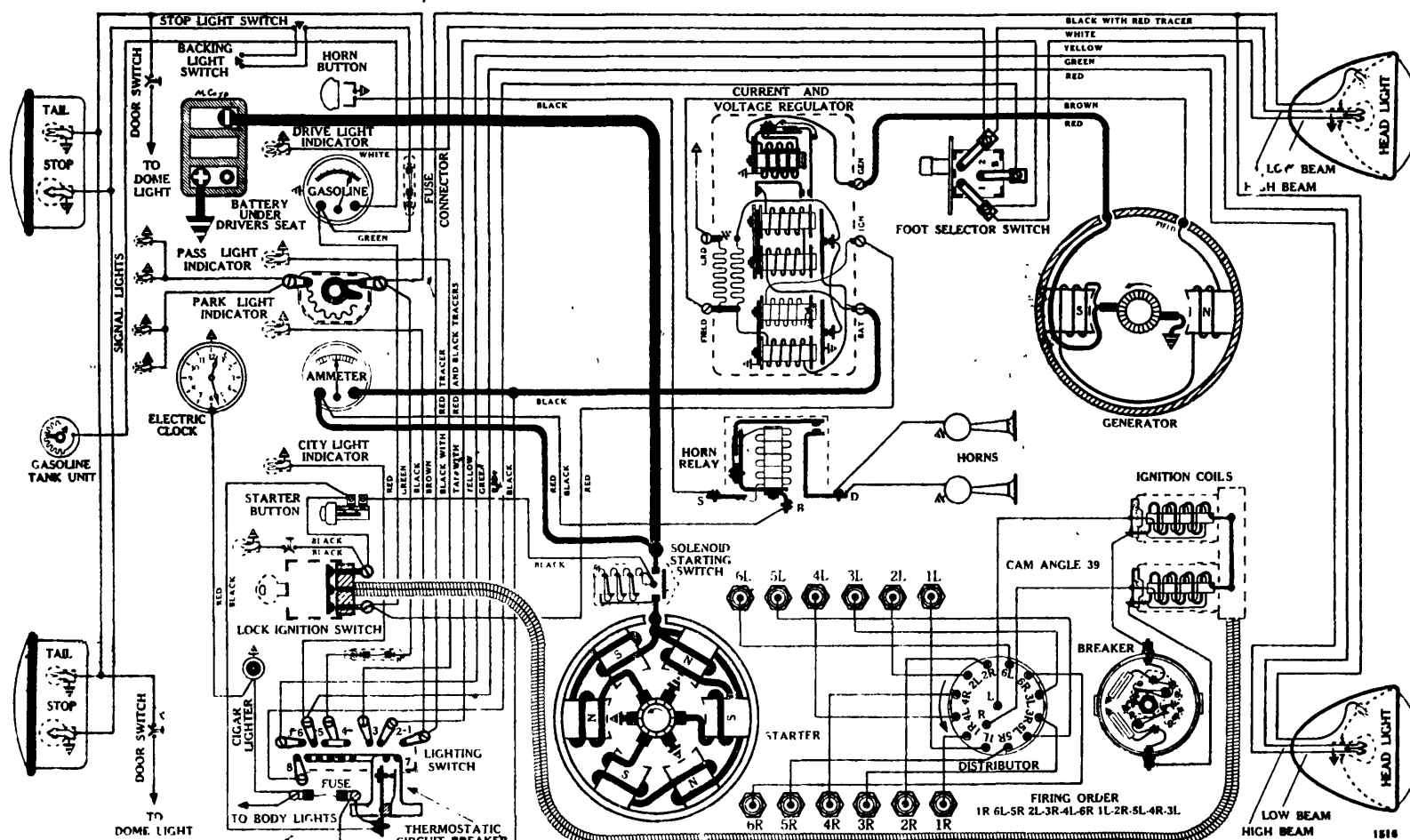
Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD (right)—2330; **HEAD (left)**—1104; **PARK**—55; **FENDER (if used)**—55; **INSTRUMENT**—63; **READING**—63; **RADIO**—51; **INDICATOR**—51; **STOP**—87; **TAIL**—63.

PACKARD

Mod ls 1506, 1507, and 1508, 67 D gre "V" Twelve s, (1937)
DELCO-REMY EQUIPPED

Engin {Bor 3-7/16
Stroke 4-1/4



BATTERY

Prest-O-Lite "HiLevel", HR-4-21, 6 volts. Positive Terminal Grounded

IMPORTANT:—Prest-O-Lite "HiLevel" batteries are fully charged at a specific gravity of 1.250, providing the electrolyte is at a level with the star in the filler tube. The gravity of conventional batteries is between 1.275 and 1.280 under like conditions. Do not try to balance the electrolyte in "HiLevel" batteries in order to raise their gravity above 1.250.

Starting Capacity—175 amps. for 20 minutes.

Minute of Discharge at 300 Amps., Zero Degrees F.—6.3

Lighting Capacity—7.5 amps. for 20 hours (150 amp. hour).

Case—Length, 13; width, 7; height, 9 1/8 inches.

STARTER

D-R Test 375 Rotation, L. H., Com. Fnd Group 18
Delco-Remy, 6V4

Connection to Engine—Bendix Drive type RCD10FXTD.

Running Force—70 amps. at 5 volts, 3000 R.P.M.

Cranking Engine—180 amps. at 5.0 volts.

Engine Cranking Speed—120 R.P.M.

Stall Data (on car)—390 amps. at 3.9 volts.

Lock Torque (for test bench use)—19 pound-feet, 500 amps. at 3.0 volts.

Brush Spring Tension—36 to 40 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1541.

Push Button Starting Control Switch—Culver-Stearns.

Armature—Delco-Remy, 1866090.

IGNITION

Rotation, L. H., Top View
(Two Different Distributors Used)

Auto-Lite, IGO-4001-A or IGO-4002-A

Auto-Lite, IGO-4001-A (High Compression Engines)

A-L Test 191

Breakers—Contact separation .018 inch on each.

Cam Angles—Points closed 29 degrees; open 21 degrees.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Unequal intervals of 33 1/2-26 1/2-33 1/2, etc. degrees between interruptions.

Timing—6 to 8 degrees before top dead center (cast iron heads, either standard or low compression); 4 to 5 1/2 degrees before top dead center (aluminum heads with compression ratio of 7 to 1). Set pointer of FUEL COMPENSATOR at "O" graduation on scale. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the 6th graduation ahead of mark "1RUDC" on front vibration dampener aligns with pointer on left front face of timing chain case cover. With "off center" end of rotor under No. 1R Dist. Cap Terminal, the stationary set of breaker points should just open. The movable points should open a similar number of graduations ahead of mark "6LUDC". If timing an engine with a high compression head stop when the 4th graduation aligns with pointer.

Spark Plugs—10-MM (AC or Champion types Y-4); Gap .026 to .030 inch.

IMPORTANT:—This is a new size spark plug and extremely small. Use special socket wrench with but a four inch handle for removing and replacing plugs of this type. Tightening leverage should not exceed 50

PACKARD

Models 1506, 1507, and 1508, 67 Degree "V" Twelve's, (1937)
DELCO-REMY EQUIPPED

inch pounds or a pull of approximately 12 pounds exerted on end of special wrench.

Firing Order—1R-6L-5R-2L-3R-4L-6R-1L-2R-5L-4R-3L.
Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600.....	300.....	Start
1040.....	520.....	2
1480.....	740.....	4
1920.....	960.....	6
2360.....	1180.....	8
2800 (Max.)	1400.....	10

Condensers—Auto-Lite, IG-2671-A and IG-2671-E.

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CE-1203.

Ign. Coil Only—A-L, CE-3186-FS.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-207-A.

Auto-Lite IGO-4002-A (Standard and Low Compression Heads)

All data for this unit same as for the IGO-4001-A, excepting the Automatic Advance, which is as follows:

A-L Test 407

Automatic Advance—8 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600.....	300.....	Start
1050.....	525.....	2
1500.....	750.....	4
1950.....	975.....	6
2400 (Max.)	1200.....	8

GENERATOR

D-R Test 1631 Rotation, L. H., Com. End Group 21
Delco-Remy, 930-F (Belt Drive)

NOTE—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating-point current and voltage regulators. The regulator should be used when testing this generator. The following performance readings were taken with the voltage regulator points short-circuited together, and the maximum generator output controlled by the vibrating-point current regulator.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	625.....	6.40
2.....	655.....	6.50
4.....	700.....	6.62
6.....	740.....	6.75
8.....	785.....	6.85
10.....	830.....	6.97
12.....	880.....	7.09
14.....	930.....	7.20
16.....	985.....	7.30
18.....	1045.....	7.41
20.....	1115.....	7.52
22.....	1185.....	7.65
24.....	1265.....	7.75
26.....	1355.....	7.89
28.....	1450 (Max.)	8.00

Motoring Freely—4½ amps. at 6 volts, 500 R.P.M.

Max. Stall Current—30 to 34 amps. at 4.9 volts.

Field Test—1.8 to 2.3 amps. at 6 volts across field coils in series.

Brush Spring Tension—22 to 26 oz. on each.

Armature—Delco-Remy, 1866069.

Charging Adjustment—No third brush. External vibrating-point current and voltage regulation.

RELAY-REGULATORS

D-R Test 1418 Delco-Remy, 5811

A combination Cut-Out Relay, Vibrating Current and Vibrating Voltage Regulators with Two Field Resistance Units. (D-R 1865615—inner; 1858018—outer Resistances).

Cut-Out Relay—Closes—6.5 to 7.0 volts.
Opens—0 to 3 amps. discharge at 6.3 volts.

Contact Gap—.018 to .025 inches.

Core Gap—.018 to .022 inches, contacts closed.

Current Regulator—Contact Spring Tension—3.5 oz. (minimum).

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.070 to .080 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Amperes Charge—28.0 to 30.0 at 70° F.

Voltage Regulator—IMPORTANT! While making voltage regulator tests short circuit current regulator with jumper across contact points.

Contact Spring Tension—3.5 oz. (minimum).

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Circuit Voltage—This voltage regulator must be adjusted on a closed circuit only.

Voltage Setting—Regulator operates at 7.55 to 7.85 volts with a generator charging rate of from 8 to 10 amps. (70° F.) and running between 2800 to 3400 R.P.M. Connect voltmeter between terminal marked "Ign" and ground.

LIGHTING

Switch—Delco-Remy, 480-M. A combination lighting switch with overload lighting thermostat and fuse.

Location—Behind instrument board.

Overload Thermostat—Contact points open within one minute at 38 amps. load (70° F.). Contacts remain closed with load of 25 amps. (70° F.).

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back to protect body lights, cigar lighter and clock. Single 20 amp. fuse (type 3A-20) in fuse connector found on wire leading from No. 4 terminal on lighting switch to protect tail light circuit.

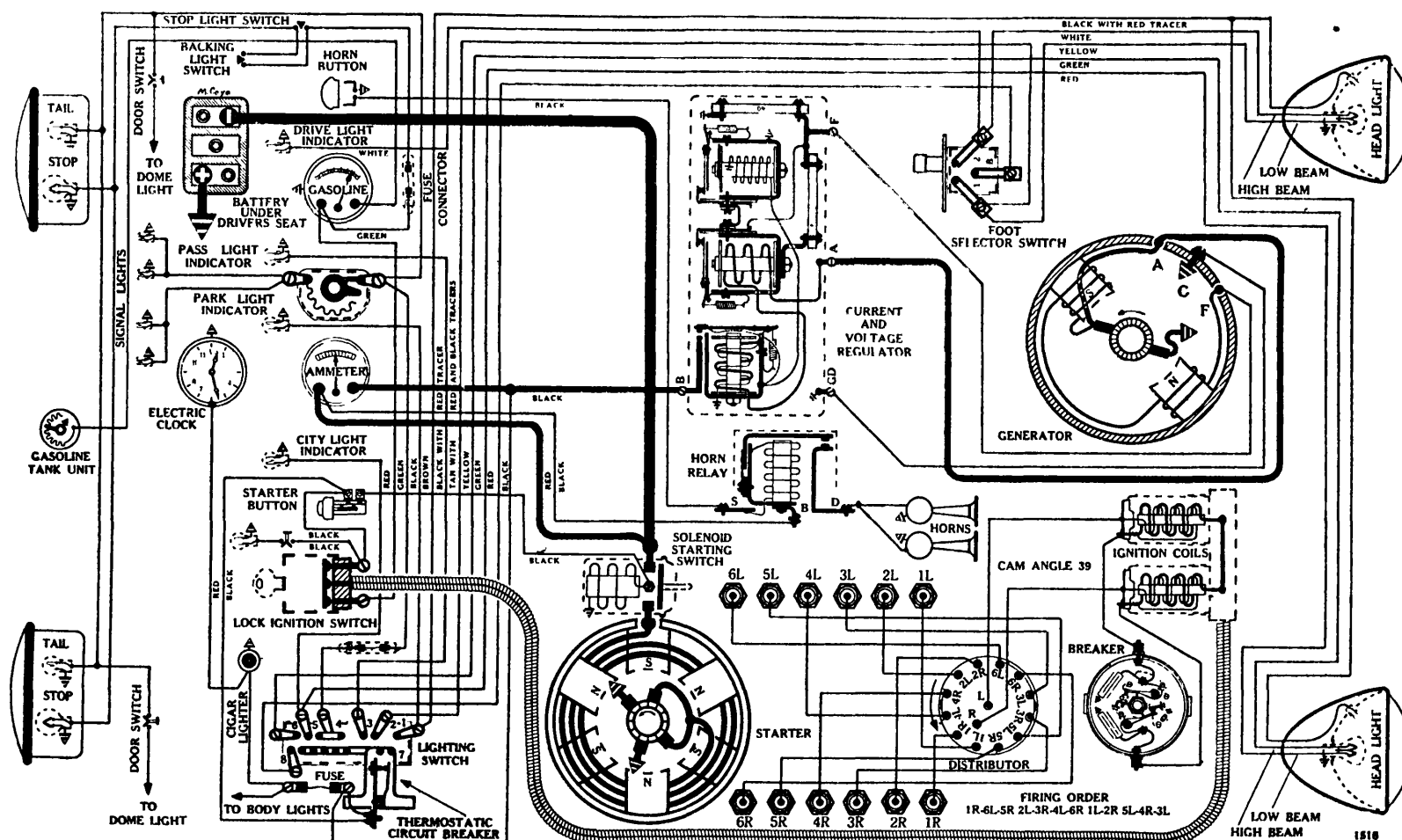
Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD (right)—2330; HEAD (left)—1104; PARK—55; FENDER (if used)—55; COURTESY—63; INSTRUMENT—63; READING—63; RADIO—51; INDICATOR—51; STOP—87; TAIL—63.

PACKARD

Models 1506, 1507, and 1508, 67 D grey "Vee" Tw lves, (1937)
 AUTO-LITE EQUIPPED

Engine { Bore 3-7/16
 { Strok 4-1/4



BATTERY

Prest-O-Lite "HiLevel", HR-4-21, 6 volts. Positive Terminal Grounded

IMPORTANT:—Prest-O-Lite "HiLevel" batteries are fully charged at a specific gravity of 1.250, providing the electrolyte is at a level with the star in the filler tube. The gravity of conventional batteries is between 1.275 and 1.280 under like conditions. Do not try to balance the electrolyte in "HiLevel" batteries in order to raise their gravity above 1.250.

Starting Capacity—175 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—6.3

Lighting Capacity—7.5 amps. for 20 hours (150 amp. hour).

Case—Length, 13; width, 7; height, 9 1/8 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite - Owen-Dyneto, Type DN-1389

Connection to Engine—Bendix Drive, Type RCD10FXTD.

Running Free—50 amps. at 6 volts, 3000 R.P.M.

Cranking Engine—145 amps. at 5.3 volts.

Engin Cranking Speed—122 R.P.M.

Stall Data (on car)—390 amps. at 3.9 volts.

Lock Torque (for test bench us)—39 pound-feet, 810 amps. at 3.6 volts.

Brush Spring T nsion—56 to 60 oz. on each (new brushes).

Sol noid Starting Switch—Auto-Lite, SS-4001.

Push Button Starting Control Switch—Culver-Stearns.

Armature—Auto-Lite - Owen-Dyneto, 13409.

IGNITION

Rotation, L. H., Top View

(Two Different Distributors Used)

Auto-Lite, IGO-4001-A or IGO-4002-A

Auto-Lite, IGO-4001-A (High Compression Engines)

A-L Test 191

Breakers—Contact separation .018 inch on each.

Cam Angles—Points closed 39 degrees; open 21 degrees.

Contact Spring Tension—18 to 20 oz. on each.

Synchronizing—Unequal intervals of 33 1/2-26 1/2-33 1/2, etc. degrees between interruptions.

Timing—6 to 8 degrees before top dead center (cast iron heads, either standard or low compression); 4 to 5 1/2 degrees before top dead center (aluminum heads with compression ratio of 7 to 1). Set pointer of FUEL COMPENSATOR at "O" graduation on scale. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when the 6th graduation ahead of mark "1RUDC" on front vibration dampener aligns with pointer on left front face of timing chain case cover. With "off center" end of rotor under No. 1RUDC, Cap Terminal, the stationary set of breaker points should just open. The movable points should open a similar number of graduations ahead of mark "6LUDC". If timing an engine with a high compression head stop when the 4th graduation aligns with pointer.

Spark Plugs—10-MM (AC or Champion types Y-1); Gap .026 to .030 inch.

IMPORTANT:—This is a new size spark plug and extremely small. Use special socket wrench with but a four inch handle for removing and replacing plugs of this type. Tightening leverage should not exceed 50

PACKARD

Mod ls 1506, 1507, and 1508, 67 Degree "V" Tw lves, (1937)

AUTO-LITE EQUIPPED

inch pounds or a pull of approximately 12 pounds exerted on end of special wrench.

Firing Order—1R-6L-5R-2L-3R-4L-6R-1L-2R-5L-4R-3L.

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600.....	300.....	Start
1010.....	520.....	2
1480.....	740.....	4
1920.....	960.....	6
2360.....	1180.....	8
2800 (Max.) ..	1400.....	10

Condensers—Auto-Lite, IG-2671-A and IG-2671-E.

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CE-1203.

Ign. Coil Only—A-L, CE-3186-FS.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-207-A.

Auto-Lite IGO-4002-A (Standard and Low Compression Heads)

All data for this unit same as for the IGO-4001-A, excepting the Automatic Advance, which is as follows:

A-L Test 407

Automatic Advance—8 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600.....	300.....	Start
1050.....	525.....	2
1500.....	750.....	4
1950.....	975.....	6
2400 (Max.) ..	1200.....	8

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GCE-4803-A (Belt Drive)

NOTE:—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating-point current and voltage regulators. The correct model regulator should be used when testing this generator. The following performance readings were taken with the voltage regulator points short-circuited together, and the maximum generator output controlled by the vibrating-point current regulator.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	925.....	6.3
2.....	980.....	6.5
4.....	1030.....	6.68
6.....	1080.....	6.81
8.....	1130.....	7.
10.....	1185.....	7.15
12.....	1239.....	7.3
14.....	1280.....	7.5
16.....	1340.....	7.65
18.....	1390.....	7.8
20.....	1440.....	8.
22.....	1495.....	8.13
24.....	1548.....	8.3
26.....	1598.....	8.46
28.....	1650.....	8.61
30.....	1700 (Max.) ..	8.8

Motoring Freely—5.03 to 5.57 amps. at 6 volts.

Max. Stall Current—34 to 36 amps. at 4.9 volts.

Field Test—1.66 to 1.84 amps. at 6 volts.

Brush Spring Tension—64 to 68 oz. (new brushes).

Armatur—Auto-Lite, GBX-2035-F.

Charging Adjustm nt—No third brush. External vibrating-point current and voltage regulation.

RELAY-REGULATORS

Auto-Lite, VRB-4008-A with Two Field Resistances, TC-51-M and TC-51-R

With Regulator removed from car and turned over; when properly assembled, Field Resistance marked 60 bridges supports of same height. R sistance marked 11 bridges the high support and one end of 60, with a flat steel washer between resistance. Maximum Current Capacity 30 amperes.

A combination Cut-Out Relay, Vibrating Point Current, and Vibrating-Point Voltage Regulator. Complete instructions for testing and servicing Regulators of this type will be found in the Technical Section of this Manual under the "Generator Charge Regulator" classification.

Cut-Out Relay— Points Close—6.5 to 7.25 volts.
Points Open—.5 to 3.0 amps. discharge.

Contact Gap—.015 inch minimum (points open).

Armature Air Gap—.034 to .038 inch (points open).

Current Regulator—Contact Spring Tension—24 oz.

Gap Between Cor and Under Side of Armature—.060 to .062 inch (when points just open).

Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).

Ampere Setting—30 amps. maximum (70° F.).

Voltage Regulator—Contact Spring Tension—24 oz.

Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).

Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).

Voltage Setting—7.4 to 7.9 (70° F.).

LIGHTING

Switch—Delco-Remy, 480-M. A combination lighting switch with overload lighting thermostat and fuse.

Location—Behind instrument board.

Overload Thermostat—Contact points open within one minute at 38 amps. load (70° F.). Contacts remain closed with load of 25 amps. (70° F.).

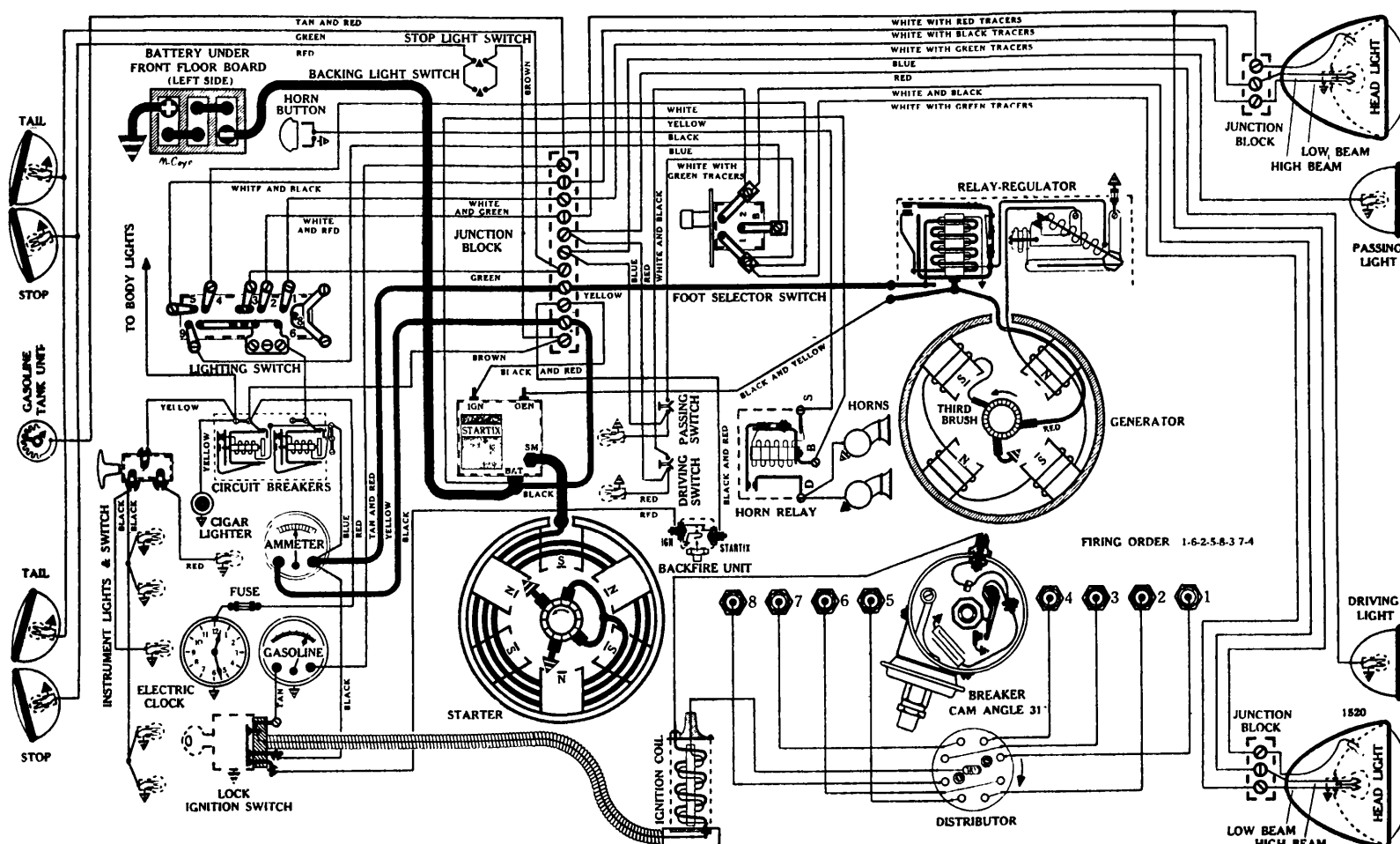
Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back to protect body lights, cigar lighter and clock. Single 20 amp. fuse (type 3A-20) in fuse connector found on wire leading from No. 4 terminal on lighting switch to protect tail light circuit.

Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD (right)—2330; HEAD (left)—1104; PARK—55; FENDER (if used)—55; COURTESY—63; INSTRUMENT—63; READING—63; RADIO—51; INDICATOR—51; STOP—87; TAIL—63.

PIERCE-ARROW

Mod 1 1701, Straight Eight, (1937)

 Engin { Bore 3-1/2
 Strok 5


BATTERY

Willard, WH-4-17, 6 volts. Positive Terminal Grounded

Starting Capacity—160 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—5.4

Lighting Capacity—6.8 amps. for 20 hours (136 amp. hour).

Case—Length, 11-11/16; width, 7-1/16; height, 9-5/16 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lit - Owen-Dyneto, Type DI-1314

Connection to Engine—Bendix Drive, Type RCD11FXT-10.

Running Fr e—60 amps. at 6 volts, 4500 R.P.M.

Cranking Engine —150 amps. at 5.4 volts.

Engine Cranking Speed—102 R.P.M.

Stall Data (on car)—450 amps. at 4.2 volts.

Lock Torque (for test bench use)—29 pound-feet, 730 amps. at 3.6 volts.

Brush Spring Tension—56 to 60 oz. on each (new brushes).

Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.

Armature—Owen-Dyneto, 16437.

IGNITION

D-R T st 17 Rotation, R. H., Top View Group 63 Delco-Remy, 663-M

(Full Automatic Spark Advance in conjunction with Delco-Remy, 681-R Vacuum Advance Unit, which controls position of Breaker Plate).

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Timing—2 degrees before top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "IGN 1-8" (found 2 degrees ahead of "U.D.C. 1-8") registers with pointer at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (Champion type J-6); Gap .030 inch.

Firing Order—1-6-2-5-8-3-7-4.

Vacuum Advance Unit (Delco-Remy, 681-R; Test No. 1906)—8 1/2 degrees (Dist. advance). Starts with vacuum of from 5 to 7 inches of mercury. Requires vacuum of from 14 to 17 inches for full travel.

Vacuum Advance Table (Delco-Remy, 681-R Vacuum Control).

Inches of Mercury	Degrees Dist. Advance
6.	Start
7.12.....	1
8.24.....	2
9.36.....	3
10.48.....	4
11.60.....	5
12.72.....	6
13.84.....	7
14.96.....	8
15.50.....	8 1/2 (Max.)

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
420.....	210.....	Start
600.....	300.....	1
780.....	390.....	2
960.....	480.....	3

PIERCE-ARROW

Mod 1 1701, Straight Eight, (1937)

1000 (1st Intermediate)	500.....	3 1/4
1200.....	600.....	4
1400 (2nd Intermediate)	700.....	4 3/4
1500.....	750.....	5
1900.....	950.....	6
2300.....	1150.....	7
2700.....	1350.....	8
3100.....	1550.....	9
3500 (Max.)	1750.....	10
Condenser —Delco-Remy, 1866049. Capacity .20 to .25 (mfd.s.).		
Ignition Coil —Delco-Remy, 539-K.		
Ignition Switch and Cable —Delco-Remy, 430-W.		

GENERATOR

Rotation, L. H., Com. End

Auto-Lite - Owen-Dyneto, Type CO-1309 (Belt Drive)

Performance Data—Gen. cold. Charge regulator points closed.

Amps.	R.P.M.	Volts
0.....	480.....	6.5
4.....	520.....	6.75
8.....	580.....	6.95
12.....	620.....	7.15
16.....	810.....	7.4
20.....	920.....	7.6
24.....	1040.....	7.8
28.....	1200.....	8.
30.....	1880 (Max.)	8.3

Motoring Freely—16 to 18 amps. at 6 volts.
Max. Stall Current—30 amps. at 5.9 volts.
Field Test—3.5 to 3.7 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5) mounted on charge regulator.
Brush Spring Tension—20 to 22 oz. on each (new brushes).
Armature—Owen-Dyneto, 23691.
Third Brush Adjustment—Not necessary to loosen cover band. Third brush position changed by turning adjusting screw in commutator end frame.

RELAY-REGULATOR

Owen-Dyneto, Type 40300

Relay Closes—6.7 to 6.9 volts.
Opens—0 to 3 amps. discharge.
Contact Gap—.030 inch.
Core Gap—.010 inch, contacts closed.

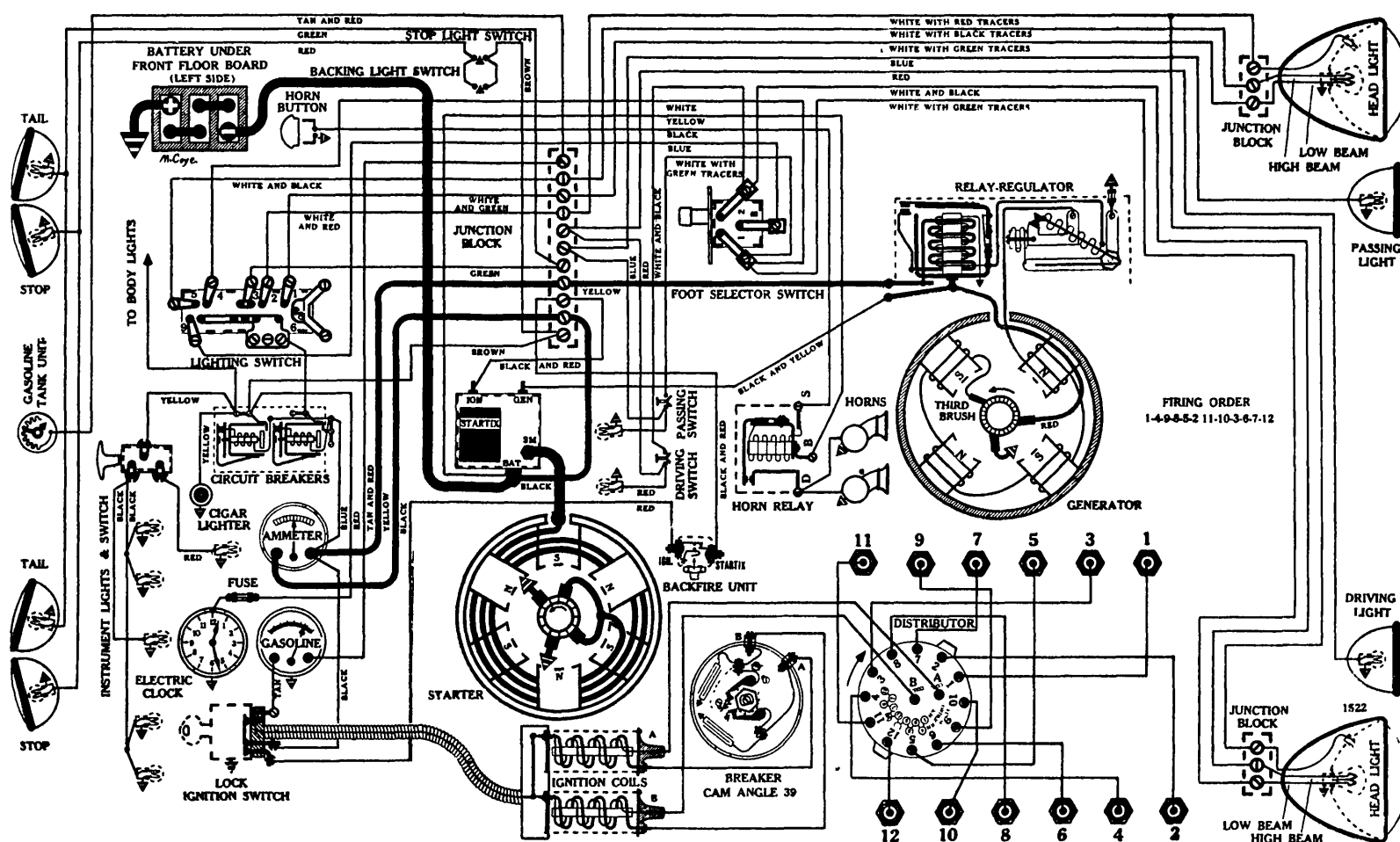
LIGHTING

Switch—Delco-Remy, 479-M.
Location—Behind instrument board.
Dash Light Switch—Delco-Remy, 1411.
Vibrating Circuit Breakers—Delco-Remy, 410-N. Starts to operate at 35 to 40 amps. Limits current to from 5 to 22 amps. Point opening .012 to .030 inch. Spring tension 5 oz. minimum (at brass button).
Horn Relay—Delco-Remy, 271-AK.
Foot Selector Switch—Delco-Remy, 471-Z.
Lamps—Refer to "Lamp Data" in Technical Section.
FENDER-HEAD — 2330; PARK — 55; PASSING AND DRIVING—1323; STOP AND BACKING—1129; LICENSE PLATE—63; AUXILIARY PILOT —64; INSTRUMENT PANEL—55; CORNER—81; DOME—81; RUMBLE SEAT OR REAR COMPARTMENT—63; SMOKER—81; TAIL—81.

PIERCE-ARROW

 Engin { Bor 3-1/2
Stroke 4

Mod ls 1702 and 1703, 80 Degre "Vee" Twelves, (1937)



BATTERY

Willard, WH-5-19, 6 volts. Positive Terminal Grounded

Starting Capacity—180 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—6.6

Lighting Capacity—7.6 amps. for 20 hours (153 amp. hour).

Case—Length, 13; width, 7-1/16; height, 9 3/4 inches.

STARTER

Rotation, L. H., Com. End

Auto-Lite - Owen-Dyneto, Type DI-1313

Connection to Engine—Bendix Drive, Type RCD11FXT-10.

Running Fr —60 amps. at 6 volts, 4500 R.P.M.

Cranking Engine—160 amps. at 5.4 volts.

Engine Cranking Speed—114 R.P.M.

Stall Data (on car)—460 amps. at 4.1 volts.

Lock Torqu (for test bench use)—29 pound-feet, 730 amps. at 3.6 volts.

Brush Spring Tension—56 to 60 oz. on each (new brushes).

Starting Switch—"Startix", type D, Automatic Starting Switch and Anti-Stall Device.

Armature—Owen-Dyneto, 16437.

IGNITION

D-R Test 1010 Rotation, R. H., Top Vi w Group 26 D lco-Remy, 4105

(Semi-Automatic Spark Advanc)

Breakers—Contact separation .013 inch on each.

Cam Angles—Points closed 38 degrees; open 22 degrees.

NOTE:—Diagram shows 39 degree cam angle, which was official up to June 1937. Delco-Remy Bulletin 1D-180 date 5-20-37 specifies 38 degrees.

Contact Spring Tension—17 to 21 oz. on each.

Synchronizing—Movable points (which fire right bank) open 20 degrees after stationary. Unequal intervals of 20-40-20, etc., degrees between interruptions.

Timing—5 degrees before top dead center with spark advanced. Slowly turn engine until No. 1 piston (left bank) is coming up on compression stroke. Stop when flywheel mark "Ign 1" (which is 5 degrees ahead of mark "UDC-1") is directly in line with pointer at flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.

Spark Plugs—14-MM (Champion type J-6); Gap .030 inch.

Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.

NOTE:—All odd cylinder numbers on left bank, No. 1 nearest radiator. All even numbers on right bank (see diagram).

Manual Advance—16 1/2 degrees (Distributor).

Automatic Advance—7 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
500.....	250.....	Start
800.....	400.....	1
1140.....	570.....	2
1480.....	740.....	3
1800.....	900.....	4
2140.....	1070.....	5
2470.....	1235.....	6
2800 (Max.)	1400.....	7

Condens r—Delco-Remy, 1837231.

PIERCE-ARROW

Models 1702 and 1703, 80 Degr "Vee" Tw lv s, (1937)

Ignition Coils—Delco-Remy, 553-E.
Ignition Switch and Cable—Delco-Remy, 430-T and 430-X.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite - Owen-Dyneto, Type CO-1309 (Belt Drive)

Performance Data—Gen. cold. Charge regulator points closed.

Amps.	R.P.M.	Volts
0.....	480.....	6.5
4.....	520.....	6.75
8.....	580.....	6.95
12.....	620.....	7.15
16.....	810.....	7.4
20.....	920.....	7.6
24.....	1040.....	7.8
28.....	1200.....	8.
30.....	1880 (Max.)	8.3

Motoring Freely—16 to 18 amps. at 6 volts.

Max. Stall Current—30 amps. at 5.9 volts.

Field Test—3.5 to 3.7 amps. at 6 volts across field coils in series.

Field Fuse—5 amps. (type 1A-5) mounted on charge regulator.

Brush Spring Tension—20 to 22 oz. on each (new brushes).

Armature—Owen-Dyneto, 23691.

Third Brush Adjustment—Not necessary to loosen cover band. Third brush position changed by turning adjusting screw in commutator end frame.

RELAY-REGULATOR

Owen-Dyneto, Type 40300

Relay Closes—6.7 to 6.9 volts.

Opens—0 to 3 amps. discharge.

Contact Gap—.030 inch.

Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 479-M.

Location—Behind instrument board.

Dash Light Switch—Delco-Remy, 1411.

Vibrating Circuit Breakers—Delco-Remy, 410-N. Starts to operate at 35 to 40 amps. Limits current to from 5 to 22 amps. Point opening .012 to .030 inch. Spring tension 5 oz. minimum (at brass button).

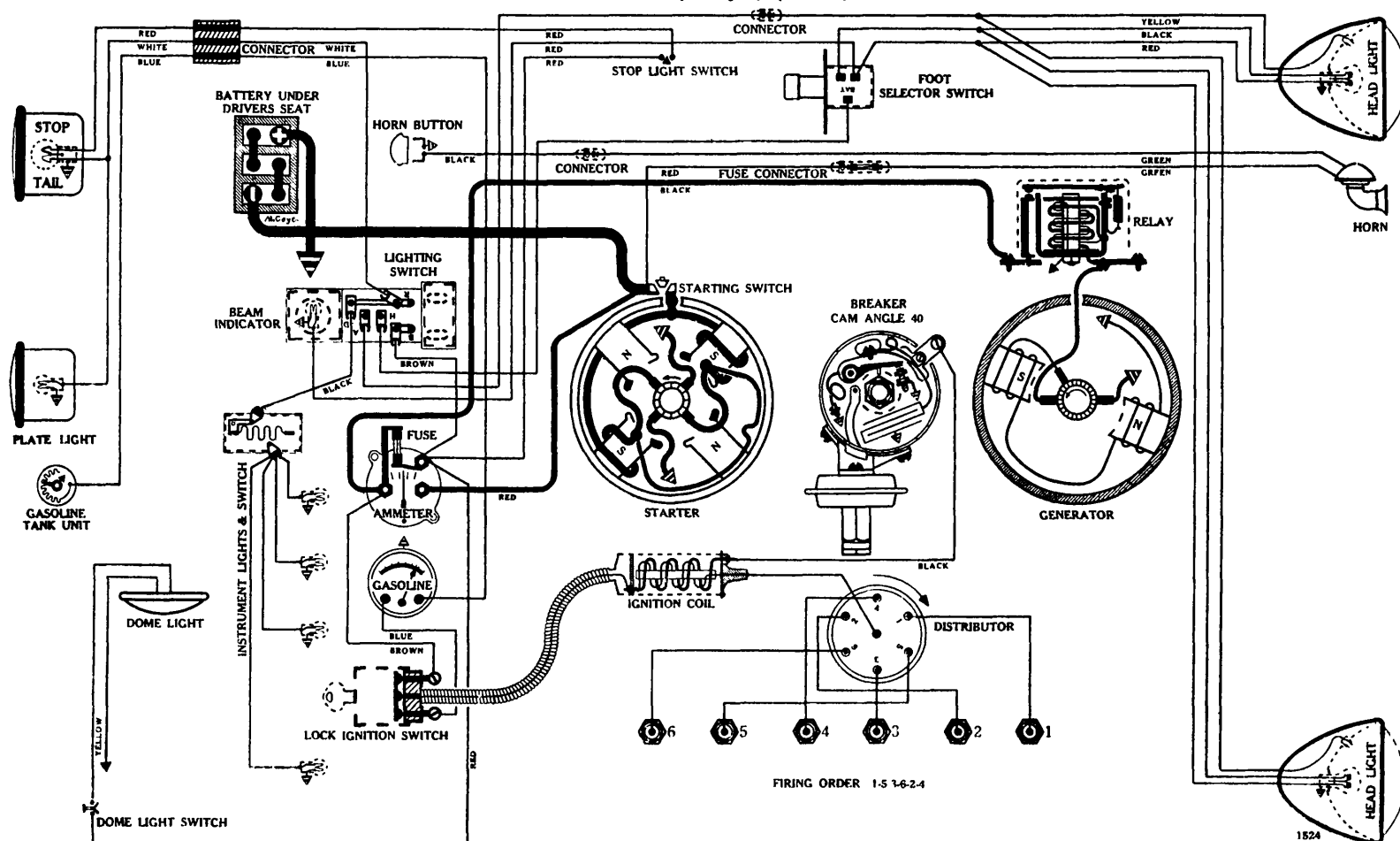
Horn Relay—Delco-Remy, 271-AK.

Foot Selector Switch—Delco-Remy, 471-Z.

Lamps—Refer to "Lamp Data" in Technical Section.
 FENDER-HEAD — 2330; PARK — 55; PASSING AND DRIVING—1323; STOP AND BACKING—1129; LICENSE PLATE—63; AUXILIARY PILOT—64; INSTRUMENT PANEL—55; CORNER—81; DOME—81; RUMBLE SEAT OR REAR COMPARTMENT—63; SMOKER—81; TAIL—81.

PLYMOUTH

Model P-3, 6 cyl., (1937)

Engine { Bore 3-1/8
Stroke 4-3/8

BATTERY

Willard, WHT-1-90, 6 volts. Positive Terminal Grounded

Starting Capacity—114 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.

Lighting Capacity—4.5 amps. for 20 hours (90 amp. hour).

Case—Length, 9-1/16; width, 7-1/16; height, 8 7/8 inches.

STARTER

A-L T st CU-417 Rotation, L. H., Com. End
Auto-Lite, MAW-4009

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Auto-Lite, MAD-3099.

Running Fr e—65 amps. at 5 1/2 volts, 4900 R.P.M.

Cranking Engine—150 amps. at 5.4 volts.

Engine Cranking Speed—156 R.P.M.

Stall Data (on car)—400 amps. at 3.3 volts.

Lock Torqu (for t st bench use)—11 1/2 pound-feet, 505 amps. at 3 volts.

Brush Spring T nsion—42 to 53 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-2677-A.

Armature—Auto-Lite, MAW-2030.

IGNITION

A-L Test 480 Rotation, R. H., Top View
Auto-Lite, IGS-4003-B-1

(Full Automatic Spark Advance in conjunction with Auto-Lite IGS-1023-CS Vacuum Chamber. This chamber controls position of Breaker Plate Assembly No. IGS-2004, which is stamped with the figure 10).

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 40 degrees; open 20 degrees.

Contact Spring Tension—18 to 20 oz.

Timing—4 degrees after top dead center. Slowly turn engine until No. 1 piston comes up on the compression stroke, and starts down on the power stroke. Stop when the "O" mark on fan pulley (which is exact T.D.C.) has moved 4 graduations past the pointer on the timing gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (Champion, type J-8); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Chamber (Auto-Lite, IGS-1023-CS; Test No. 456)—10 degrees (Dist. advance). Starts with vacuum of 5 inches of mercury. Requires vacuum of 14 inches for full travel.

Vacuum Advance Table (Auto-Lite IGS-1023-CS Vacuum Chamber).

Inches of Mercury	Degrees Dist. Advance
5.	Start
5.9	1
6.8	2
7.7	3
8.6	4
9.5	5

PLYMOUTH

Model P-3, 6 cyl., (1937)

10.4	.....	6
11.3	.....	7
12.2	.....	8
13.1	.....	9
14.0	.....	10 (Max.)

Automatic Advance—11 degrees (Distributor).
Eng. R.P.M. Dist. R.P.M. Degrees Advance (Dist.)
700..... 350..... Start
770..... 385..... 2
800 (Intermediate) 400..... 3
1160..... 580..... 4
1890..... 945..... 6
2610..... 1305..... 8
3340..... 1670..... 10
3700 (Max.) 1850..... 11
Condenser—Auto-Lite, IG-3927-A.
Ign. Coil, Lock Switch and Cable Assembly Complete—
A-L, CL-4601.
Ign. Coil Only—A-L, CL-3224-S.
Ign. Switch and Cable Assembly Less Lock—A-L,
CE-1187-DES.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBM-4606-C-1 (Belt Drive)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	850.....	6.3
2.....	915.....	6.5
4.....	980.....	6.75
6.....	1050.....	6.95
8.....	1125.....	7.2
10.....	1220.....	7.4
12.....	1330.....	7.65
14.....	1470.....	7.85
16.....	1650.....	8.1
18.....	2000 (Max.)	8.3

Motoring Fr ly—5.32 to 5.38 amps. at 6 volts.
Max. Stall Current—24 to 26 amps. at 5.3 volts.
Field Test—3.8 to 4.2 amps. at 6 volts.
Brush Spring Tension—50 to 60 oz. on each (new
brushes).
Armature—Auto-Lite, GBM-2065-F.
Third Brush Adjustment—Loosen cover band. Shift
third brush by hand. Mounting plate held in any
position by friction clamp washers. In no case should
the third brush be set closer than 4 commutator bars
between it and the insulated main brush.

RELAY

Auto-Lite, CB-4014

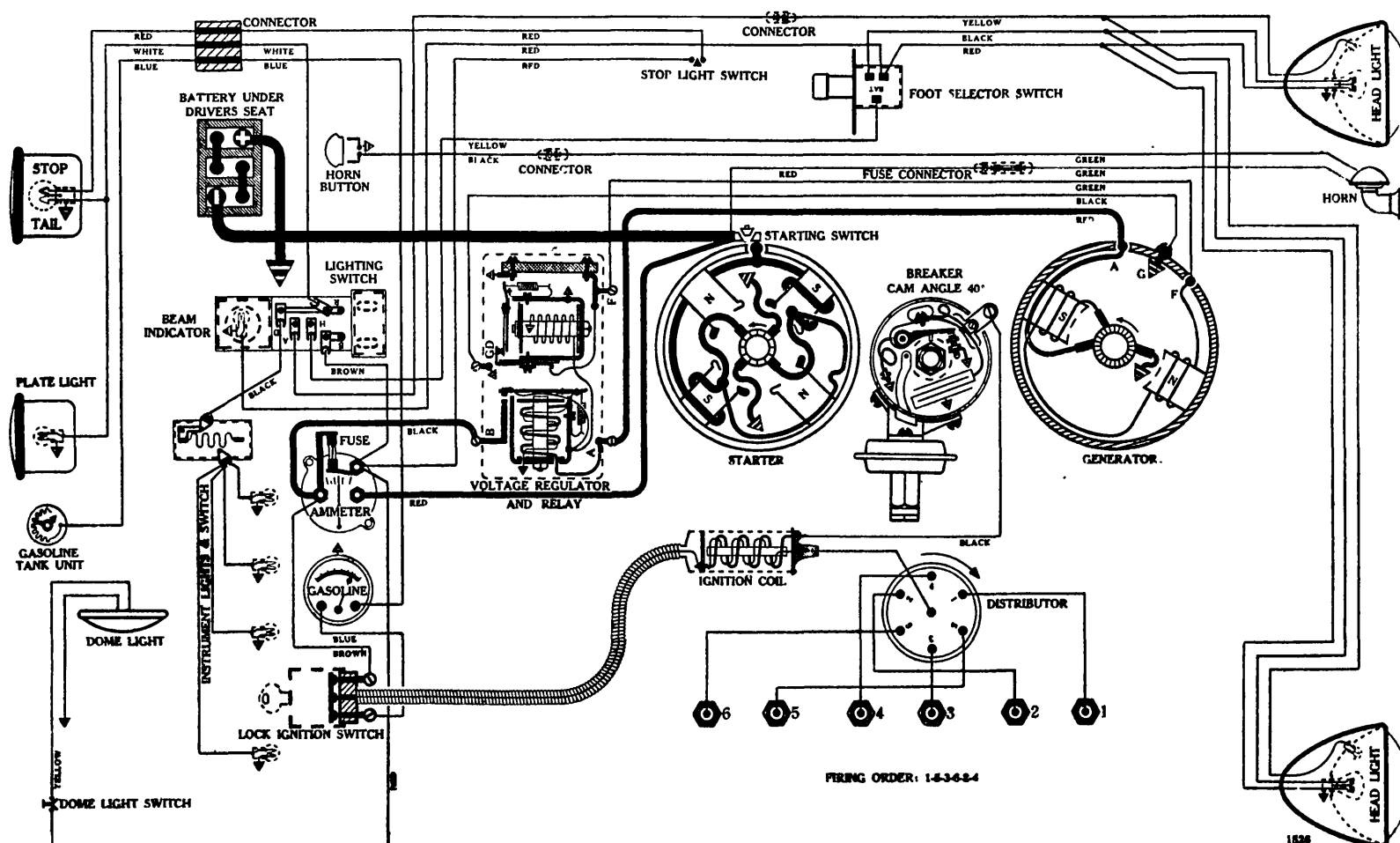
Points Close—6.5 to 7.25 volts.
Points Open—.5 to 3.0 amps. discharge.
Contact Gap—.015 inch minimum (points open).
Armature Air Gap—.034 to .038 inch (points open).

LIGHTING

Switch—Chrysler, No. 667044.
Location—Behind instrument board.
Fuses—(Lighting) Single 20 amp. fuse (type 3A-20) in
special bayonet type fuse holder attached to back of
ammeter. (If dual horns), 30 amp. (type 3A-30)
fuse in horn relay.
Horn Relay—Auto-Lite, HR-4002 (if used).
Foot Selector Switch—Douglas, No. 5544.
Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2331; PARK—55; INDICATOR—51; IN-
STRUMENT—55; DOME—87; LICENSE PLATE—
63; IGNITION LOCK—51; STOP AND TAIL—1158.

PLYMOUTH

Model P-4, 6 cyl., (1937)

 Engin { Bore 3-1/8
 { Strok 4-3/8
**BATTERY**

Willard, WHT-1-90, 6 volts. Positive Terminal Grounded

Starting Capacity—114 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.

Lighting Capacity—4.5 amps. for 20 hours (90 amp. hour).

Case—Length, 9-1/16; width, 7-1/16; height, 8 7/8 inches.

STARTER

A-L Test CU-417 Rotation, L. H., Com. End
 Auto-Lite, MAW-4009

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Auto-Lite, MAD-3099.

Running Free—65 amps. at 5 1/2 volts, 4900 R.P.M.

Cranking Engine—150 amps. at 5.4 volts.

Engine Cranking Speed—156 R.P.M.

Stall Data (on car)—400 amps. at 3.3 volts.

Lock Torque (for test bench use)—11 1/2 pound-feet, 505 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-2677-A.

Armature—Auto-Lite, MAW-2030.

IGNITION

A-L Test 480 Rotation, R. H., Top View
 Auto-Lite, IGS-4003-B-1

(Full Automatic Spark Advance in conjunction with Auto-Lite IGS-1023-CS Vacuum Chamber. This Chamber controls position of Breaker Plate Assembly No. IGS-2004 which is stamped with the Figure 10.)

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 40 degrees; open 20 degrees.

Contact Spring Tension—18 to 20 oz.

Timing—4 degrees after top dead center. Slowly turn engine until No. 1 piston comes up on the compression stroke, and starts down on the power stroke. Stop when the "O" mark on fan pulley (which is exact T.D.C.) has moved 4 graduations past the pointer on the timing gear case cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (Champion, type J-8); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Vacuum Chamber (Auto-Lite, IGS-1023-CS; test No. 456)—10 degrees (Dist. advance). Starts with vacuum of 5 inches of mercury. Requires vacuum of 14 inches for full travel.

Vacuum Advance Table (Auto-Lite IGS-1023-CS Vacuum Chamber).

PLYMOUTH

Model P-4, 6 cyl., (1937)

Inches of Mercury	Degrees Dist. Advance
5.	Start
5.9	1
6.8	2
7.7	3
8.6	4
9.5	5
10.4	6
11.3	7
12.2	8
13.1	9
14.0	10 (Max.)

Automatic Advance—11 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
700	350	Start
770	385	2
800 (Intermediate)	400	3
1160	580	4
1890	945	6
2610	1305	8
3340	1670	10
3700 (Max.)	1850	11

Condenser—Auto-Lite, IG-3927-A.

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, CL-4601.

Ign. Coil Only—A-L, CL-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-1187-DES.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GCJ-4802-A (Belt Drive)

NOTE:—This is an especially designed third brush current control generator, to be operated in conjunction with a vibrating-point voltage regulator. The following performance readings were taken with the generator field terminal grounded to the generator frame, and the voltage regulator inoperative.

Performance Data—Gen. cold.

Amps	R.P.M.	Volts
0	825	6.2
2	870	6.38
4	915	6.55
6	960	6.7
8	1020	6.89
10	1075	7.05
12	1135	7.22
14	1200	7.38
16	1270	7.53
18	1340	7.7
20	1430	7.89
22	1545	8.05
24	1720	8.2
25	1850 (Max.)	8.3

Motoring Freely—4.0 to 4.4 amps. at 6 volts.

Max. Stall Current—23 to 30 amps. at 5.2 volts.

Field Test—1.9 to 2.1 amps. at 6 volts.

Brush Spring Tension—27 to 53 oz. (new brushes).

Armature—Auto-Lite, GCJ-2006-F.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers. In no case should third brush be adjusted nearer than 2 commutator bars to the insulated main brush. (2 to 2½ bars is approximately correct).

RELAY-REGULATOR

Auto-Lite VRD-4002-A with TC-51L Field

Resistance Unit

A combination Cut-Out Relay and Vibrating-Point Voltage Regulator. Complete instructions for testing and servicing Regulators of this type, together with trouble shooting charts, will be found in the Technical Section of this Manual, under the "Generator Charge Regulator" classification.

Cut-Out Relay—Points Close—6.5 to 7.25 volts.
Points Open—.5 to 3.0 amps. discharge.

Contact Gap—.015 inch minimum (points open).

Armature Air Gap—.034 to .038 inch (points open).

Voltage Regulator—Contact Spring Tension—24 oz.

Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).

Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).

Voltage Setting—7.4 to 7.9 (70° F.).

LIGHTING

Switch—Chrysler, No. 667044.

Location—Behind instrument board.

Fuses—(lighting) Single 20 amp. fuse (type 3A-20) in special bayonet type fuse holder attached to back of ammeter. (If dual horns), 30 amp. (type 3A-30) fuse in horn relay.

Horn Relay—Auto-Lite, HR-4002 (if used).

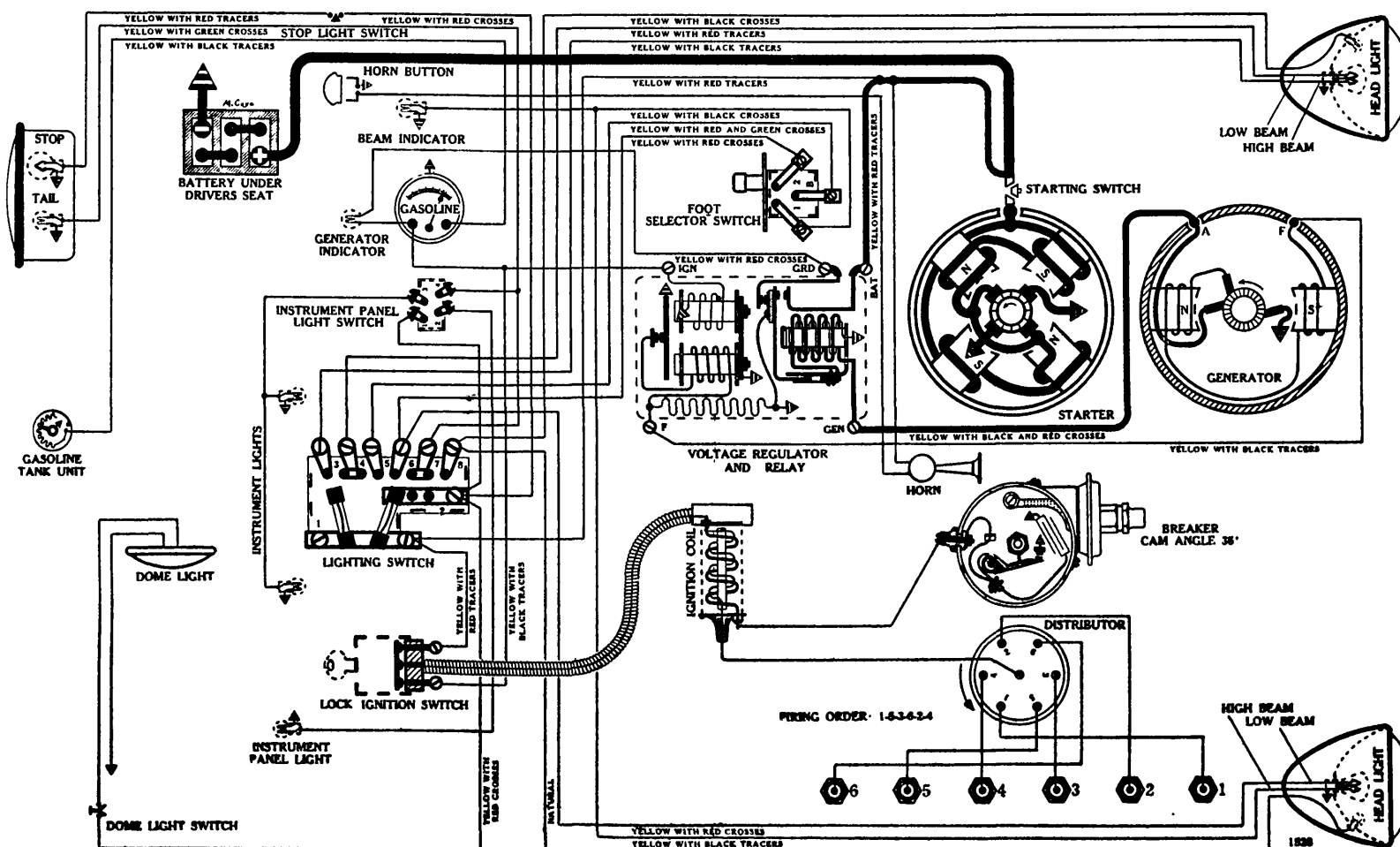
Foot Selector Switch—Douglas, No. 5544.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2331 (Bar Filament); PARK—55; INDICATOR—51; INSTRUMENT—55; DOME—87; LICENSE PLATE—63; IGNITION LOCK—51; STOP AND TAIL—1158.

PONTIAC

Model 37-26, 6 cyl., (1937)

Engine { Bore 3-7/16
Strok 4



BATTERY

Delco-Remy, 15-AA, 6 volts. Negative Terminal Grounded

Starting Capacity—115 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.3

Lighting Capacity—4.7 amps. for 20 hours (94 amp. hour).

Case—Length, 8-15/16; width, 7; height, 8-11/16 inches.

STARTER

D-R T at 382 Rotation, L. H., Com. End Group 49
Delco-Remy, 729-E

Connection to Engine—Mechanical gear shift, incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on motor, and partially opens the throttle during starting.

Start r Pinion and Clutch Assembly—Delco-Remy, 1856669.

Num b r T th on Pinion—9.

Num b r T th on Flywheel—139.

Cranking Ratio—15.4 to 1.

Running Fr e—60 amps. at 5 volts, 6000 R.P.M.

Cranking Engine—150 amps. at 5.3 volts.

Engin Cranking Spe d—132 R.P.M.

Stall Data (on car)—460 amps. at 4 volts.

Lock Torqu (for test bench use)—15 pound-feet, 600 amps. at 3 volts.

Brush Spring T nsion—24 to 28 oz. on each (new brushes).

Starting Switch—Delco-Remy, 820052.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test 146 Rotation, L. H., Top View Group 81
Delco-Remy, 647-D

(Full Automatic Spark Advance in conjunction with Delco-Remy, 681-M Vacuum Advance Unit, which controls position of Breaker Plate).

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 35 degrees; open 25 degrees.

Contact Spring Tension—17 to 21 oz.

Octane Selector (Gaselector)—Before timing ignition loosen INDICATOR ARM clamping screw, as well as the thumb screw on side of engine, and bring pointer to "O" graduation on scale. Relock screws. Graduations permit of an advance or retard of 10 degrees.

Timing—2 to 6 degrees before top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when first flywheel mark "IGN 1 & 6" is in line with pointer on flywheel housing. (NOTE: There are two marks "IGN 1 & 6" on flywheel. The first mark is 6 degrees before T.D.C., and the second mark 2 degrees before T.D.C. The recommended setting is by the first mark, to compensate for wear.) With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-7); Gap .025 inch.

Firing Ord r—1-5-3-6-2-4.

Vacuum Advanc Unit (D lco-R my, 681-M; T at No. 1907)—8½ degrees (Dist. advance). Starts with vacuum of from 9 to 11 inches of mercury. Requires vacuum of from 16 to 18 inches for full travel.

PONTIAC

Mod 1 37-26, 6 cyl., (1937)

Vacuum Advance Table (Delco-Remy, 681-M Vacuum Control).

Inches of Mercury	Degrees Dist. Advance
10.	Start
10.83.....	1
11.66.....	2
12.49.....	3
13.30.....	4
14.13.....	5
14.96.....	6
15.78.....	7
16.60.....	8
17.00.....	8½ (Max.)

Automatic Advance—14¼ degrees (Distributor).

NOTE:—The automatic advance curve for this unit, when plotted on co-ordinate paper, will be found to differ quite radically from other 1937 advance characteristics. There are two "intermediates". The advance starts at 180 R.P.M., and increases at a gradual slope until it reaches the 1st intermediate at 1050 R.P.M. During the next speed increase of 400 R.P.M., or until the 2nd intermediate is reached at 1450 R.P.M. the distributor advances but ½ a degree. From then on until the peak is reached at 2000 R.P.M. the advance is quite rapid. Be advised that the values of the two intermediates differ from the official specifications originally released by Delco-Remy. Our figures are in accordance with official data supplied by letter advising of changes.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
360.....	180.....	Start
800.....	400.....	2
1240.....	620.....	4
1670.....	835.....	6
2100 (1st Intermediate)	1050.....	8
2900 (2nd Intermediate)	1450.....	8½
3180.....	1590.....	10
3560.....	1780.....	12
3940.....	1970.....	14
4000 (Max.)	2000.....	14¼

Condenser—Delco-Remy, 1865972. Capacity .20 to .25 (mfd.).

Ignition Coil—Delco-Remy, 539-L.

Ignition Switch and Cable—Delco-Remy, 435-G.

GENERATOR

D-R Test 1271 Rotation, L. H., Com. End Group 48
Delco-Remy, 948-S (Belt Drive)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts
0.....	750.....	6.5
4.....	900.....	6.9
8.....	1100.....	7.3
12.....	1350.....	7.7
16.....	1750.....	8.1
22.....	3300 (Max.)	8.5

Motoring Freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5½ volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Charging Adjustment—Fixed third brush. External vibrating-point voltage regulation.

RELAY-REGULATOR

D-R Test 1294 Delco-Remy, 5808

A combination of Cut-Out Relay and Vibrating Voltage Regulator

Cut-Out Relay—**Closes**—6.5 to 7.0 volts.
Opens—0 to 3 amps. discharge at 6.3 volts.

Contact Gap—.018 to .025 inch.

Core Gap—.018 to .022 inch, contacts closed.

Voltage Regulator—**Contact Spring Tension**—2.7 to 3.5 ounces (minimum).

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Circuit Voltage—This voltage regulator must be adjusted on a closed circuit only.

Voltage Setting—Regulator operates at 7.55 to 7.85 volts, with a generator charging rate of from 8 to 10 amps. (70° F.), and running between 2800 and 3000 R.P.M. Connect voltmeter between terminal marked "Ign." and ground.

LIGHTING

Switch—Delco-Remy, 480-V. Combination lighting switch and fuse block.

Location—Behind instrument board.

Fuses—Two 20 amp fuses (type 3A-20), with spare mounted on switch back. One fuse protects left head light only. Other fuse protects all other lighting circuits.

Instrument Light Switch—Delco-Remy, 1406.

Stop Light Switch—Delco-Remy, 476-U or 476-R.

Horn Relay—Delco-Remy, 271-C (if used).

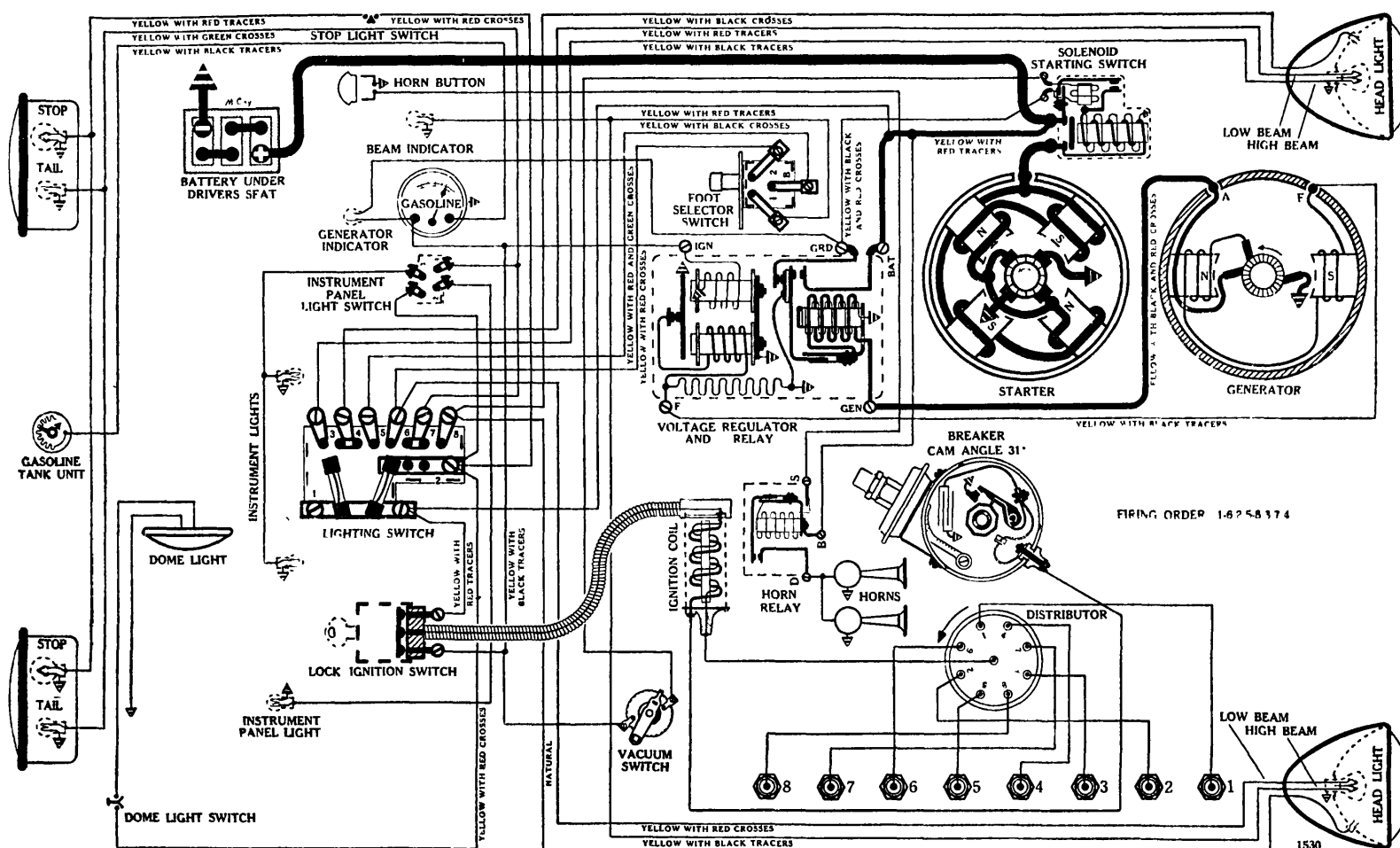
Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2320; PARK—55; INSTRUMENT—55;
DOME—81; INDICATOR—51; STOP—87; TAIL—63.

PONTIAC

Model 37-28, Straight Eight, (1937)

Engine {Bor 3-1/4
Strok 3-3/4



BATTERY

Delco-Remy, 17-K, 6 volts. Negative Terminal Grounded

Starting Capacity—131 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—4.4

Lighting Capacity—5.5 amps. for 20 hours (110 amp. hour).

Case—Length, 10 3/8; width, 7; height, 8 5/8 inches.

STARTER

D-R Test 395 Rotation, L. H., Com. End Group 47
Delco-Remy, 727-S

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by the foot accelerator working in conjunction with a vacuum switch, remote control relay (located in solenoid unit), and an auxiliary set of grounding points found on cut-out relay (located in regulator unit).

Starter Pinion and Clutch Assembly—Delco-Remy, 1856669.

Number Teeth on Pinion—9.

Number Teeth on Flywheel—139.

Cranking Ratio—15.4 to 1.

Running Free—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—150 amps. at 5.3 volts.

Engine Cranking Speed—156 R.P.M.

Stall Data (on car)—380 amps. at 4.5 volts.

Lock Torque (for test bench use)—15 pound-feet, 600 amps. at 3 volts.

Brush Spring Tension—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1546.

Vacuum Starting Control Switch—Delco-Remy, 1588.

Armature—Delco-Remy, 823881.

IGNITION

D-R Test 147 Rotation, L. H., Top View Group 63

Delco-Remy, 663-X

(Full Automatic Spark Advance in conjunction with Delco-Remy, 681-N Vacuum Advance Unit, which controls position of Breaker Plate).

Breaker—Contact separation .015 inch.

Cam Angles—Points closed 31 degrees; open 14 degrees.

Contact Spring Tension—19 to 23 oz.

Octane Selector (Gaselector)—Before timing ignition loosen INDICATOR ARM clamping screw, as well as the thumb screw on side of engine, and bring pointer to "O" graduation on scale. Relock screws. Graduations permit of an advance or retard of 10 degrees.

Timing—2 to 6 degrees before top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when first flywheel mark "IGN 1 & 8" is in line with pointer on flywheel housing. (NOTE: There are two marks "IGN 1 & 8" on flywheel. The first mark is 6 degrees before T.D.C., and the second mark 2 degrees before T.D.C. The recommended setting is by the first mark, to compensate for wear.) With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—14-MM (AC type K-7); Gap .025 inch.

Firing Order—1-6-2-5-8-3-7-4.

PONTIAC

Mod 1 37-28, Straight Eight, (1937)

Vacuum Advance Unit (Delco-Remy, 681-N; Test No. 1904)—11 degrees (Dist. advance). Start; with vacuum of from 4 to 6 inches of mercury. Requires vacuum of from 16 to 21 inches for full travel.

Vacuum Advance Table (Delco-Remy, 681-N Vacuum Control).

Inches of Mercury	Degrees Dist. Advance
5.....	Start
6.35.....	1
7.70.....	2
9.05.....	3
10.40.....	4
11.75.....	5
13.10.....	6
14.45.....	7
15.80.....	8
17.15.....	9
18.50.....	10 (Max.)

Automatic Advance—14 degrees (Distributor).

NOTE:—The automatic advance curve for this unit, when plotted on co-ordinate paper, will be found to differ quite radically from other 1937 advance characteristics. There are two "intermediates". The advance starts at 120 R.P.M., and increases at a gradual slope until it reaches the 1st intermediate at 1100 R.P.M. During the next speed increase of 300 R.P.M., or until the 2nd intermediate is reached at 1550 R.P.M. the distributor advances but 1 degree. From then on until the peak is reached at 2100 R.P.M. the advance is quite rapid. Be advised that the values of the two intermediates differ from the official specifications originally released by Delco-Remy. Our figures are in accordance with official data supplied by letter advising of changes.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
240.....	120.....	Start
800.....	400.....	2
1730.....	865.....	4
2200 (1st Intermediate)	1100.....	5
2800.....	1400.....	6
3100 (2nd Intermediate)	1550.....	6½
3320.....	1660.....	8
3608.....	1804.....	10
3900.....	1950.....	12
4200 (Max.)	2100.....	14

Condenser—Delco-Remy, 1865972. Capacity .20 to .25 (mfd.).

Ignition Coil—Delco-Remy, 539-L.

Ignition Switch and Cable—Delco-Remy, 435-G.

GENERATOR

D-R Test 1271 Rotation, L. H., Com. End Group 48
Delco-Remy, 948-S (Belt Drive)

Performance Data—Gen. cold. Field terminal grounded to generator frame.

Amps.	R.P.M.	Volts
0.....	750.....	6.5
4.....	900.....	6.9
8.....	1100.....	7.3
12.....	1350.....	7.7
16.....	1750.....	8.1
22.....	3300 (Max.)	8.5

Motoring Freely—4 to 4½ amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5½ volts.

Field Test—2.3 to 2.6 amps. at 6 volts across field coils in series.

Brush Spring Tension—Main brushes, 22 to 26 oz. Third, 16 to 20 oz. (new brushes).

Armature—Delco-Remy, 1854856.

Charging Adjustment—Fixed third brush. External vibrating-point voltage regulation.

RELAY-REGULATOR

D-R Test 1294 Delco-Remy, 5808

A combination of Cut-Out Relay and Vibrating Voltage Regulator

Cut-Out Relay—**Closes**—6.5 to 7.0 volts.
Opens—0 to 3 amps. discharge at 6.3 volts.
Contact Gap—.018 to .025 inch.
Core Gap—.018 to .022 inch, contacts closed.

Voltage Regulator—**Contact Spring Tension**—2.7 to 3.5 ounces (minimum).

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Circuit Voltage—This voltage regulator must be adjusted on a closed circuit only.

Voltage Setting—Regulator operates at 7.55 to 7.85 volts, with a generator charging rate of from 8 to 10 amps. (70° F.), and running between 2800 to 3000 R.P.M. Connect voltmeter between terminal marked "Ign." and ground.

Solenoid Relay—(Located in Solenoid Unit):

D-R Test 623
Closes—1.9 volts (max.).
Opens—1.0 to 1.2 volts.
Contact Gap—.035 inch.
Core Gap—.010 inch, contacts closed.

LIGHTING

Switch—Delco-Remy, 480-V. Combination lighting switch and fuse block.

Location—Behind instrument board.

Fuses—Two 20 amp fuses (type 3A-20), with spare mounted on switch back. One fuse protects left head light only. Other fuse protects all other lighting circuits.

Instrument Light Switch—Delco-Remy, 1406.

Stop Light Switch—Delco-Remy, 476-U or 476-R.

Horn Relay—Delco-Remy, 271-C (if used).

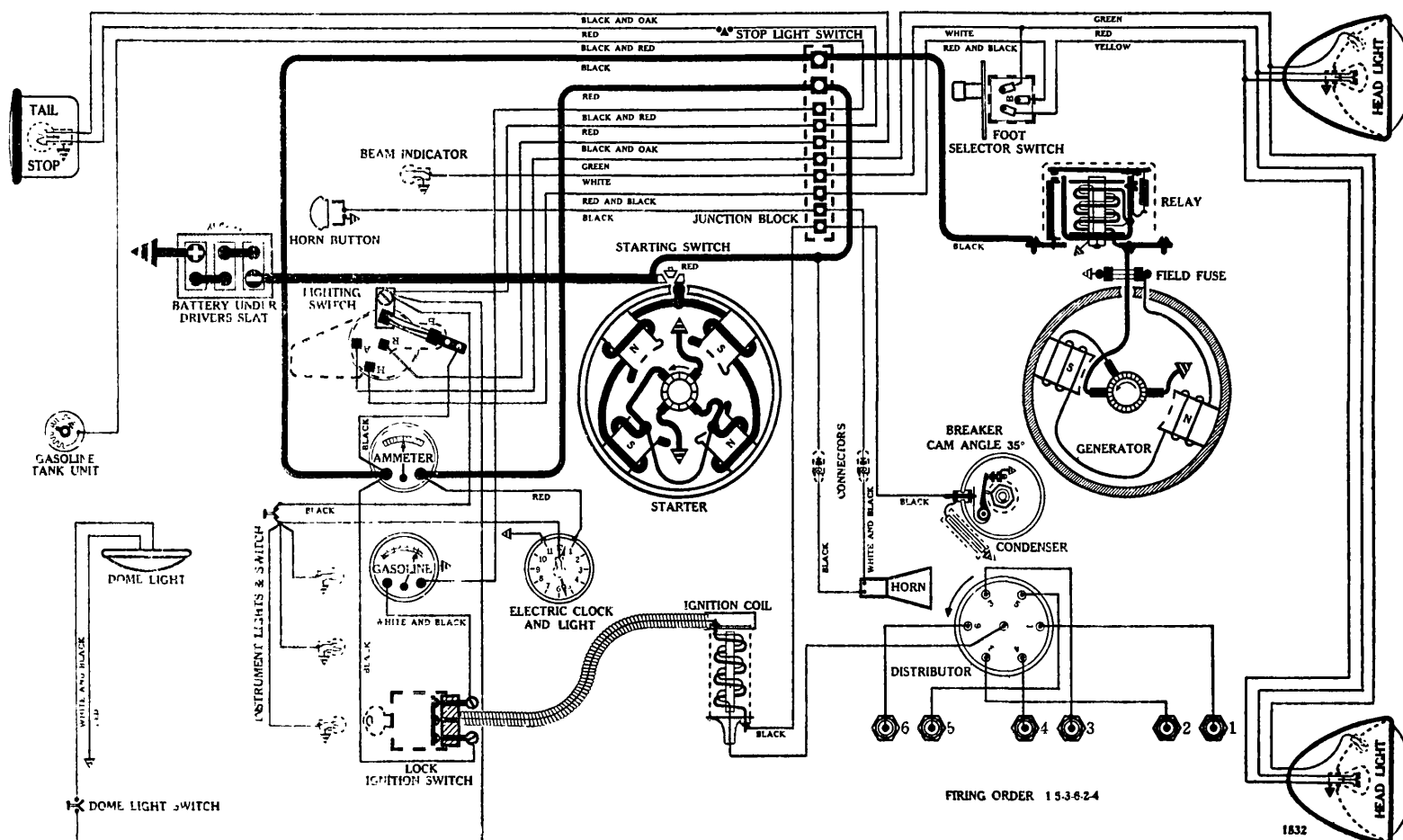
Foot Selector Switch—Delco-Remy, 471-T.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2320; PARK—55; INSTRUMENT—55;
DOME—81; INDICATOR—51; STOP—87; TAIL—63.

STUDEBAKER

Model 5-A, Dictator, 6 cyl., (1937)

Engin { B re 3-1/4
Str k 4-3/8



BATTERY

Willard, WHT-2-105, 6 volts. Positive Terminal Grounded

Starting Capacity—125 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.9

Lighting Capacity—5.2 amps. for 20 hours (105 amp. hour).

Cas —Length, 10-5/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Two Starting Motors Used

Auto-Lit, MAX-4028 (with Mechanical Shift) and
MAX-4019 (with Bendix Drive)

A-L Test CU-430

Auto-Lite, MAX-4028 (First 15,000 Cars)

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Auto-Lite, MAW-3099.

Running Free—65 amps. at 5½ volts, 5300 R.P.M.

Cranking Engine—160 amps. at 5.3 volts.

Engine Cranking Speed—142 R.P.M.

Stall Data (on car)—485 amps. at 3.9 volts.

Lock Torqu (for test bench use)—16½ pound-feet, 640 amps. at 3 volts.

Brush Spring T nsion—42 to 53 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-2677-B.

Armature—Auto-Lite, MAW-2030.

A-L Test CU-430

Auto-Lite, MAX-4019 (After Car 5551001)

Connection to Engine—Bendix Drive, Type A-1729.

Running Free—65 amps. at 5½ volts, 5300 R.P.M.

Cranking Engine—170 amps. at 5.4 volts.

Engine Cranking Speed—144 R.P.M.

Stall Data (on car)—480 amps. at 3.9 volts.

Lock Torque (for test bench use)—16½ pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-3737-S, mounted on starter. Switch should not close with less than 2.3 lbs. pull applied at right angles to hole in extreme end of lever.

Armature—Auto-Lite, MAW-2091.

IGNITION

A-L Test 469 Rotation, L. H., Top View

Auto-Lite, IGW-4001

(Full Automatic Spark Advance in conjunction with Auto-Lite, VC-4004 Ignition Vacuum Control, which moves the entire Distributor).

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 35 degrees; open 25 degrees.

Contact Spring Tension—.018 to .020 oz.

Timing—2 degrees before top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when "Ign" mark on vibration dampener (found approximately 9/64 inches ahead of "U.D.C. 1-6" mark) registers with pointer on the timing gear cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

STUDEBAKER

Model 5-A, Dictator, 6 cyl., (1937)

Spark Plugs—18-MM (Champion, type 8); Gap .025 inch.

NOTE:—For extremely fast and hard driving during hot weather use Champion, type C-7.

Firing Order—1-5-3-6-2-4.

Ignition Vacuum Control (Auto-Lite, VC-4004; Test No. 505)—6 degrees (Dist. advance). Starts with vacuum of 3 inches of mercury. Requires a vacuum of 12 inches for full travel.

Vacuum Advance Table (Auto-Lite, VC-4004 Ignition Vacuum Control).

NOTE:—The official factory CU-505 curve, sent us by Auto-Lite, shows an "Intermediate" at 6 inches of mercury. Instead of a straight curve it is of the "dog-leg" type.

Inches of Mercury	Degrees Dist. Advance
3.	Start
4.	1
5.	2
6. (Intermediate)	3
8.	4
10.	5
12.	6 (Max.)

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
800.....	400.....	Start
1200.....	600.....	2
1600.....	800.....	4
2000.....	1000.....	6
2400.....	1200.....	8
2800 (Max.)	1400.....	10

Condenser—Auto-Lite, IGB-1025.

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4634.

Ign. Coil Only—A-L, IG-3245-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-2242-AS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GBM-4607-A-2 (Belt Driv)

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	880.....	6.3
2.....	940.....	6.5
4.....	1000.....	6.7
6.....	1070.....	6.9
8.....	1150.....	7.1
10.....	1240.....	7.3
12.....	1325.....	7.5
14.....	1440.....	7.7
16.....	1590.....	7.9
18.....	1815.....	8.1
20.....	2400 (Max.)	8.3

Motoring Freely—5.51 to 6.09 amps. at 6 volts.

Max. Stall Current—22 to 24 amps. at 5.4 volts.

Field Test—3.8 to 4.2 amps. at 6 volts.

Field Fuse—5 amps. (type 1-A-5)

Brush Spring Tension—24 to 36 oz. on each (new brushes).

Armature—Auto-Lite, GBM-2065-B.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers. In no case should the third brush be set closer than 4-2/3 to 4-3/4 commutator bars between it and the insulated main brush.

RELAY

Auto-Lite, CB-4021

Points Close—6.5 to 7.25 volts.

Points Open—.5 to 3.0 amps. discharge.

Contact Gap—.015 inch minimum (points open).

Armature Air Gap—.034 to .038 inch (points open).

LIGHTING

Switch—H. A. Douglas Mfg. Co., No. 5443-C.

Location—Behind instrument board.

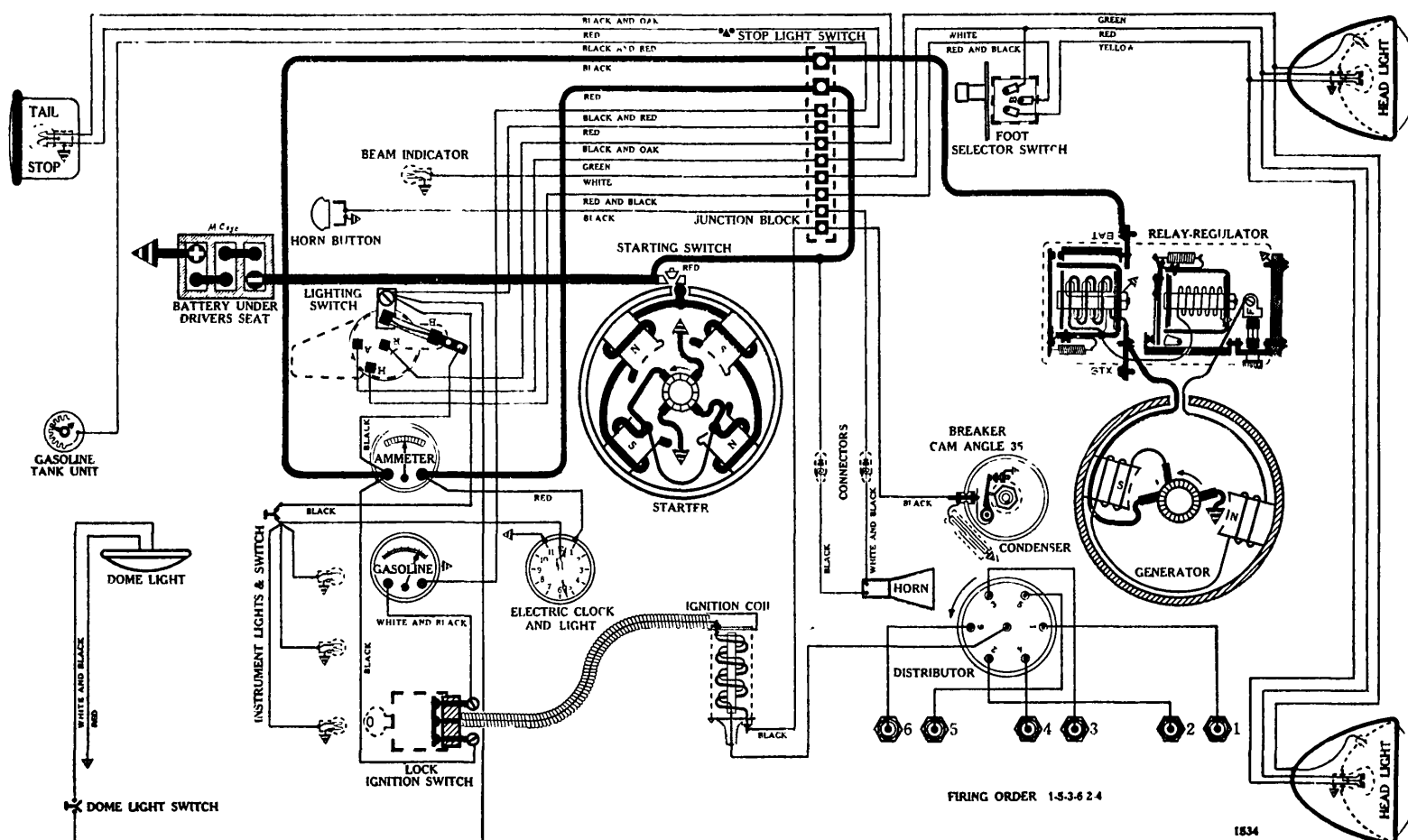
Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back.

Foot Selector Switch—R.B.M. Mfg. Co., No. 1050-A.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2331; PARK—55; INSTRUMENT—55;
DOME—63; INDICATOR—55; STOP AND TAIL—1158.

STUDEBAKER

Model 6-A, Dictator, 6 cyl., (1937)

Engine {Bor 3-1/4
Strok 4-3/8**BATTERY**

Willard, WHT-2-105, 6 volts. Positive Terminal Grounded

Starting Capacity—125 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.9

Lighting Capacity—5.2 amps. for 20 hours (105 amp. hour).

Case—Length, 10-5/16; width, 7-1/16; height, 8-13/16 inches.

STARTER

Rotation, L. H., Com. End
Two Starting Motors Used

Auto-Lite, MAX-4028 (with Mechanical Shift) and
MAX-4019 (with Bendix Drive)

A-L Test CU-430

Auto-Lite, MAX-4028 (First 15,000 Cars)

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Initial movement of gear shifting lever causes pinion to engage with flywheel. Further movement of lever closes switch on starting motor.

Starter Pinion and Clutch Assembly—Auto-Lite, MAW-3099.

Running Free—65 amps. at 5½ volts, 5300 R.P.M.

Cranking Engine—160 amps. at 5.3 volts.

Engine Cranking Speed—142 R.P.M.

Stall Data (on car)—485 amps. at 3.9 volts.

Lock Torque (for test bench use)—16½ pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-2677-B.

Armature—Auto-Lite, MAW-2030.

A-L Test CU-430

Auto-Lite, MAX-4019 (After Car 5551001)

Connection to Engine—Bendix Drive, Type A-1729.

Running Free—65 amps. at 5½ volts, 5300 R.P.M.

Cranking Engine—170 amps. at 5.4 volts.

Engine Cranking Speed—144 R.P.M.

Stall Data (on car)—480 amps. at 3.9 volts.

Lock Torque (for test bench use)—16½ pound-feet, 640 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Starting Switch—Auto-Lite, SW-3737-S, mounted on starter. Switch should not close with less than 2.3 lbs. pull applied at right angles to hole in extreme end of lever.

Armature—Auto-Lite, MAW-2091.

IGNITION

A-L Test 469 Rotation, L. H., Top View

Auto-Lite, IGW-4001

(Full Automatic Spark Advance in conjunction with Auto-Lite, VC-4004 Ignition Vacuum Control, which moves the entire Distributor).

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 35 degrees; open 25 degrees.

Contact Spring Tension—.018 to .020 oz.

Timing—2 degrees before top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when "Ign" mark on vibration dampener (found approximately 9/64 inches ahead of "U.D.C. 1-6" mark) registers with pointer on the timing gear cover. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

STUDEBAKER

Model 6-A, Dictator, 6 cyl., (1937)

Spark Plugs—18-MM (Champion, type 8); Gap .025 inch.

NOTE:—For extremely fast and hard driving during hot weather use Champion, type C-7.

Firing Order—1-5-3-6-2-4.

Ignition Vacuum Control (Auto-Lite, VC-4004; Test No. 505)—6 degrees (Dist. advance). Starts with vacuum of 3 inches of mercury. Requires a vacuum of 12 inches for full travel.

Vacuum Advance Table (Auto-Lite, VC-4004 Ignition Vacuum Control).

NOTE:—The official factory CU-505 curve, sent us by Auto-Lite, shows an "Intermediate" at 6 inches of mercury. Instead of a straight curve it is of the "dog-leg" type.

Inches of Mercury	Degrees Dist. Advance
3.	Start
4.	1
5.	2
6. (Intermediate)	3
8.	4
10.	5
12.	6 (Max.)

Automatic Advance—10 degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
800.....	400.....	Start
1200.....	600.....	2
1600.....	800.....	4
2000.....	1000.....	6
2400.....	1200.....	8
2800 (Max.)	1400.....	10

Condenser—Auto-Lite, IGB-1025.

Ign. Coil, Lock Switch and Cable Assembly Complete—A-L, IG-4634.

Ign. Coil Only—A-L, IG-3245-S.

Ign. Switch and Cable Assembly Less Lock—A-L, CE-2242-AS.

LIGHTING

Switch—H. A. Douglas Mfg. Co., No. 5443-C.

Location—Behind instrument board.

Fuses—Single 20 amp. fuse (type 3A-20) mounted on switch back.

Foot Selector Switch—R.B.M. Mfg. Co., No. 1050-A.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2331; PARK—55; INSTRUMENT—55;
DOME—63; INDICATOR—55; STOP AND TAIL—1158.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GCM-4802-A-4 (Belt Drive)

Performance Data—Gen. cold. Field lead grounded to generator frame.

Amps.	R.P.M.	Volts
0.....	750.....	6.3
2.....	810.....	6.5
4.....	870.....	6.7
6.....	935.....	6.9
8.....	1010.....	7.1
10.....	1090.....	7.25
12.....	1190.....	7.45
14.....	1295.....	7.65
16.....	1420.....	7.85
18.....	1560.....	8.0
20.....	1750.....	8.2
22.....	2100 (Max.)	8.4

Motoring Freely—5.75 to 6.25 amps. at 6 volts.

Max. Stall Current—24 to 26 amps. at 5.1 volts.

Field Fuse—5 amps. (type 1A-5) in regulator unit.

Field Test—3.50 to 3.89 amps. at 6 volts.

Brush Spring Tension—23 to 27 oz. on each (new brushes).

Armature—Auto-Lite, GCJ-2006-B.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers. In no case should third brush be adjusted nearer than 2 commutator bars and 1 mica strip, to the insulated main brush.

RELAY-REGULATOR

Auto-Lite, TC-4302-A with TC-51 Resistance Unit

A combination of Cut-Out Relay and Voltage Op rated Two-Stage Charge Regulator

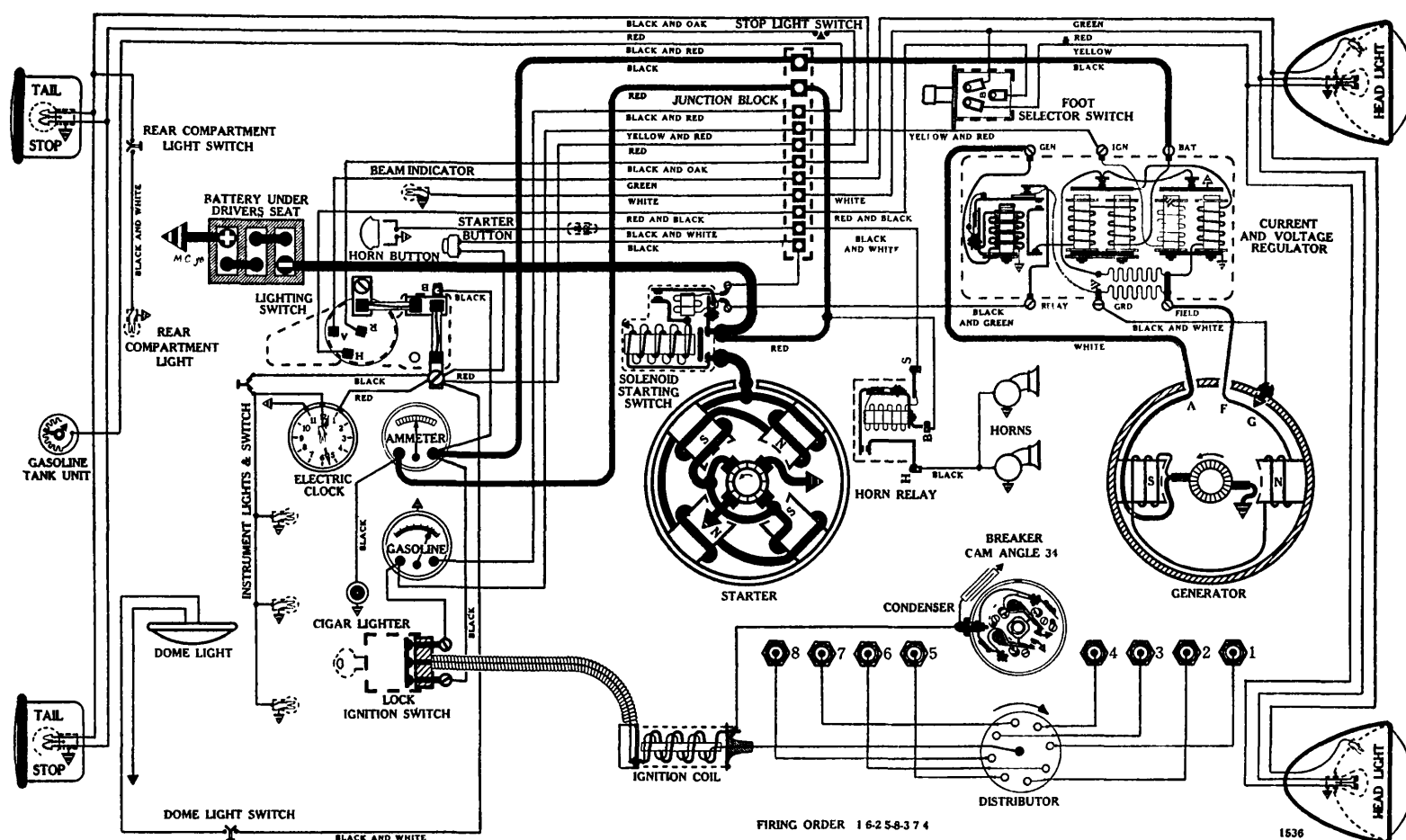
Cut-Out Relay—	Points Close —6.5 to 7.25 volts.
	Points Open —5 to 3.0 amps. discharge.
	Contact Gap —.015 inch minimum (points open).
	Armature Air Gap —.034 to .038 inch (points open).
Regulator— A-L Test 119	Contact Spring Tension —10 to 12 oz.
	Points Open —8.25 volts (70° F.).
	Points Close —7.0 volts.
	Contact Opening —.005 inch (minimum).
	Core Gap —.020 inch (contacts closed).

For adjustments at other temperatures see complete data in Technical Section.

STUDEBAKER

Engine { Bore 3-1/16
Strok 4-1/4

M del 3-C, President Straight Eight, (1937)

**BATTERY**

Willard, WHT-2-105, 6 volts. Positive Terminal Grounded

Starting Capacity—125 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.9

Lighting Capacity—5.2 amps. for 20 hours (105 amp. hour).

Case—Length, 10-5/16; width, 7-1/16; height, 8-13/16 inches.

STARTERD-R T at 396 Rotation, L. H., Com. End Group 49
Delco-Remy, 729-G

Connection to Engine—Mechanical pinion shift incorporating an over-running clutch. Shift is operated by a solenoid mounted on starting motor, which is controlled by a push button switch located on the instrument board, working in conjunction with a remote control relay (located in solenoid unit), and an auxiliary set of grounding points located on cut-out relay armature in the apparatus box. Feed for solenoid control circuit is taken from the appliance fuse on lighting switch.

Start r Pinion and Clutch Assembly—Delco-Remy, 1862058.

Running Fr e—65 amps. at 5 volts, 5500 R.P.M.

Cranking Engine—145 amps. at 5.3 volts.

Engin Cranking Spe d—122 R.P.M.

Stall Data (on car)—390 amps. at 3.65 volts.

Lock Torque (for t at b nch us)—16 pound-feet, 600 amps. at 3 volts.

Brush Spring T nsion—24 to 28 oz. on each (new brushes).

Solenoid Starting Switch—Delco-Remy, 1516.
Armature—Delco-Remy, 820158.**IGNITION**D-R Test 955 Rotation, R. H., Top View Group 62
Delco-Remy, 662-M

(Full Automatic Spark Advance in conjunction with Delco-Remy, 681-S Distributor Vacuum Control, which moves the entire Distributor).

Breakers—Contact separation .020 inch on each.**Cam Angles**—Points closed 34 degrees; open 56 degrees (each breaker separately). Primary circuit closed 34 degrees; open 11 degrees (with both breakers operating).**Contact Spring Tension**—17 to 21 oz. on each.**Synchronizing**—Movable points open 45 degrees after stationary. Equal 45 degree intervals between interruptions.**Timing**—Exact top dead center. With No. 1 piston on compression stroke, bring flywheel mark "U.D.C. 1-8" directly under pointer on the right side of flywheel housing. With rotor under No. 1 Dist. Cap Terminal, stationary set of breaker points should just open.**Spark Plugs**—18-MM (Champion, type 8); Gap .025 inch.**NOTE**—For extremely fast and hard driving during hot weather use Champion, type C-7.**Firing Order**—1-6-2-5-8-3-7-4.**Vacuum Distributor Control (Delco-Remy, 681-S; Test No. 1905)**—7 degrees (Dist. advance). Starts with vacuum of from 5 to 7 inches of mercury. Requires vacuum of from 13 to 16 inches for full travel.

STUDEBAKER

Mod 1 3-C, Pr sid nt Straight Eight, (1937)

Vacuum Advance Table (Delco-Remy, 681-S Distributor Control).

Inches of Mercury	Degrees Dist. Advance
6.	Start
7.22.....	1
8.44.....	2
9.66.....	3
10.88.....	4
12.10.....	5
13.30.....	6
14.50.....	7 (Max.)

Automatic Advance—14½ degrees (Distributor).

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
330	165.....	Start
770	385.....	2
1230	615.....	4
1680	840.....	6
2130	1065.....	8
2580	1290.....	10
3040	1520.....	12
3480	1740.....	14
3600 (Max.)	1800.....	14½

Condenser—Delco-Remy, 1838163. Capacity .20 to .25 (mfd.).

Ignition Coil—Delco-Remy, 537-B.

Ignition Switch and Cable—Delco-Remy, 1866783.

GENERATOR

D-R Test 1630 Rotation, L. H., Com. End Group 61
Delco-Remy, 961-H (Belt Drive)

NOTE:—This is a straight shunt generator with no third brush. Generator output is controlled by a combination of vibrating-point current and voltage regulators. The regulator should be used when testing this generator. The following performance readings were taken with the voltage regulator points short-circuited together, and the maximum generator output controlled by the vibrating-point current regulator.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	675.....	6.40
2.....	730.....	6.50
4.....	780.....	6.65
6.....	835.....	6.80
8.....	890.....	6.90
10.....	950.....	7.05
12.....	1020.....	7.18
14.....	1090.....	7.30
16.....	1175.....	7.40
18.....	1260.....	7.55
20.....	1355.....	7.70
22.....	1460.....	7.80
24.....	1575.....	7.90
25.....	1650 (Max.)	8.00

Motoring Freely—3½ to 3¾ amps. at 6 volts, 450 R.P.M.

Max. Stall Current—26 to 28 amps. at 5 volts.

Field Test—2 to 2.2 amps. at 6 volts across field coils in series.

Brush Spring Tension—22 to 26 oz. on each (new brushes).

Armature—Delco-Remy, 1866171.

Charging Adjustm nt—No third brush. External vibrating-point current and voltage regulation.

RELAY-REGULATORS

D-R Test 1419 Delco-Remy, 5818

A combination Cut-Out Relay, Vibrating Current and Vibrating Voltage Regulators with Two Field Resistance Units. (D-R 1865615—inner; 1858018—outer Resistances).

Cut-Out Relay—Closes—6.5 to 7.0 volts.
Opens—0 to 3 amps. discharge at 6.3 volts.

Contact Gap—.018 to .025 inches.

Core Gap—.018 to .022 inches, contacts closed.

Current Regulator—Contact Spring Tension—3.5 oz. (minimum).

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.070 to .080 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Ampere Charge—24.0 to 26.0 at 70° F.

Voltage Regulator—IMPORTANT! While making voltage regulator tests short circuit current regulator with jumper across contact points.

Contact Spring Tension—3.5 oz. (minimum).

Gap Between Fiber Bumper and Contact Spring Stop—.008 to .013 inches (armature up).

Air Gap—.060 to .070 inches (armature pressed down until fiber bumper just touches stop).

Contact Opening—.015 to .025 inches (armature pressed all the way down against stop).

Circuit Voltage—This voltage regulator must be adjusted on a closed circuit only.

Voltage Setting—Regulator operates at 7.55 to 7.85 volts with a generator charging rate of from 8 to 10 amps. (70° F.) and running between 2800 and 3400 R.P.M. Connect voltmeter between terminal marked "Ign" and ground.

Solenoid Relay—(Located in Solenoid Unit):

D-R Test 613 Closes—3.2 volts (max.).

Opens—1.6 to 2.0 volts.

Contact Gap—.030 to .045 inch.

Core Gap—.010 to .014 inch, contacts closed.

LIGHTING

Switch—H. A. Douglas, No. 5536-C.

Location—Behind instrument board.

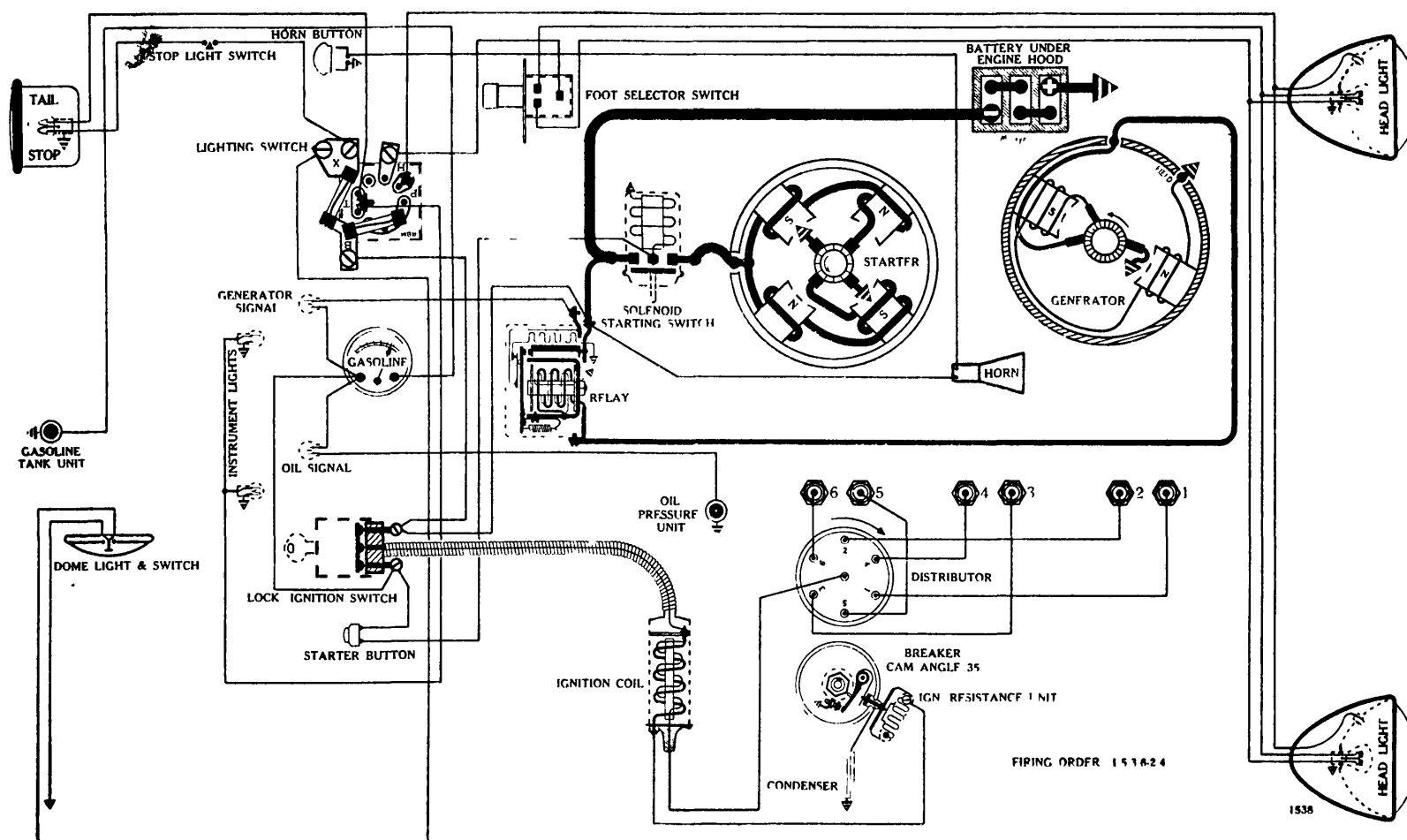
Fuses—Two 20 amp. (type 3A-20) fuses on switch back. The fuse which is parallel to instrument board protects the body, clock, instrument and stop light circuits. The fuse which is at right angles to instrument board protects the lighting circuits.

Foot Selector Switch—R.B.M. Mfg. Co., No. 1050-A.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2331; **PARK**—55; **IGNITION SWITCH**—55; **INSTRUMENT**—51; **DOVE**—81; **TRUNK**—81; **STOP AND TAIL**—1158.

TERRAPLANE

Model 70 and 71, 6 cyl., (1937)

Engine { Bore 3
Stroke 5

BATTERY

National, ST3-17X, 6 volts. Positive Terminal Grounded

Starting Capacity—120 amps. for 20 minutes.

Minutes of Discharge at 300 Amps., Zero Degrees F.—3.2

Lighting Capacity—4.9 amps. for 20 hours (98 amp. hour).

Case—Length, 10-9/16; width, 7 1/4; height, 7-15/16 inches.

STARTER

A-L Test CU-252 Rotation, L. H., Com. End
Auto-Lite, MAB-4075

Connection to Engine—Bendix Drive, Type A-1673.

Running Free—60 amps. at 5 1/2 volts, 3700 R.P.M.

Cranking Engine—120 amps. at 5.55 volts.

Engine Cranking Speed—144 R.P.M.

Stall Data (on car)—440 amps. at 4.3 volts.

Lock Torque (for test bench use)—15 1/2 pound-feet, 582 amps. at 3 volts.

Brush Spring Tension—42 to 53 oz. on each (new brushes).

Solenoid Starting Switch—Auto-Lite, SS-4001.

Push Button Starting Control Switch—R.B.M., No. 1815.

Armature—Auto-Lite, MAB-2113.

IGNITION

A-L Test 447 Rotation, R. H., Top View

Auto-Lite, IGW-4012-A

(Full Automatic Spark Advance)

Breaker—Contact separation .020 inch.

Cam Angle—Points closed 35 degrees; open 25 degrees.

Contact Spring Tension—18 to 20 oz.

Timing—Exact top dead center. Slowly turn engine until No. 1 piston is coming up on compression stroke. Stop when flywheel mark "U.D.C. 1-6" registers with pointer cast in flywheel inspection hole. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs (Standard Head)—14-MM (Champion type J-8); Gap .025 inch.

(Super Power Dome Head)—14-MM (Champion type H-10); Gap .025 inch.

Firing Order—1-5-3-6-2-4.

Automatic Advance—14 degrees (Distributor).

NOTE:—The Terraplane car, in 1936 used an IGB-4301-B distributor (A-L Test 447), which is the same test as this curve; however, in 1936 the peak of 14 degrees was given at a speed of 1580 R.P.M. This year it is given as 1575 R.P.M.

Eng. R.P.M.	Dist. R.P.M.	Degrees Advance (Dist.)
600.....	300.....	Start
666.....	333.....	1
734.....	367.....	2
800 (Intermediate)	400.....	3
1014.....	507.....	4
1228.....	614.....	5
1442.....	721.....	6
1656.....	828.....	7
1870.....	935.....	8
2084.....	1042.....	9
2298.....	1149.....	10
2512.....	1256.....	11
2726.....	1363.....	12
2940.....	1470.....	13
3150 (Max.)	1575.....	14

TERRAPLANE

Model 72, 6 cyl., (1937)

Ign. Coil, Lock Switch and Cable Assembly Complete—
A-L, IG-4644.

Ign. Coil Only—A-L, IG-3224-S.

Ign. Switch and Cable Assembly Less Lock—A-L,
CE-2233-FS.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GCJ-4803-A (Belt Drive)

NOTE:—This is an especially designed third brush current control generator, to be operated in conjunction with a vibrating-point voltage regulator. The following performance readings were taken with the generator field terminal grounded to the generator frame and the voltage regulator inoperative.

Performance Data—Gen. cold.

Amps.	R.P.M.	Volts
0.....	825.....	6.2
2.....	870.....	6.38
4.....	915.....	6.55
6.....	960.....	6.7
8.....	1020.....	6.89
10.....	1075.....	7.05
12.....	1135.....	7.22
14.....	1200.....	7.38
16.....	1270.....	7.53
18.....	1340.....	7.7
20.....	1430.....	7.89
22.....	1545.....	8.05
24.....	1720.....	8.2
25.....	1850 (Max.).....	8.3

Motoring Freely—4.0 to 4.4 amps. at 6 volts.

Max. Stall Current—28 to 30 amps. at 5.2 volts.

Field Test—1.9 to 2.1 amps. at 6 volts.

Brush Spring Tension—27 to 53 oz. (new brushes).

Armature—Auto-Lite, GCJ-2006.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY-REGULATOR

Auto-Lite VRD-4003-B with TC-51L Field Resistance Unit

A combination Cut-Out Relay and Vibrating-Point Voltage Regulator. Complete instructions for testing and servicing Regulators of this type, together with trouble shooting charts, will be found in the Technical Section of this Manual, under the "Generator Charge Regulator" classification.

IMPORTANT! Early production cars came through with Auto-Lite VRD-4003-A Regulators. These regulators were designed to operate at too low a voltage, which resulted in discharged batteries. When the "A" units are found on a car the "B" regulator should be substituted.

Cut-Out Relay—

Points Close—6.5 to 7.25 volts.

Points Open—.5 to 3.0 amps. discharge.

Contact Gap—.015 inch minimum (points open).

Armature Air Gap—.034 to .038 inch (points open).

Voltage Regulator—Contact Spring Tension—24 oz.

Gap Between Core and Under Side of Armature—.060 to .062 inch (when points just open).

Contact Opening—.010 to .020 inch (with armature pressed down against stop pin).

Voltage Setting—7.7 to 8.2 (70° F.).

LIGHTING

Switch—R.B.M. Mfg. Co., No. 1700.

Location—Behind instrument board.

Fuses—Two 20 amp. fuses (type 3A-20) mounted on switch back. The fuse which connects terminals "B" to "X" protects Dome, Stop Light, Cigar Lighter, and Flood Lamp circuits. The other fuse protects lighting circuits.

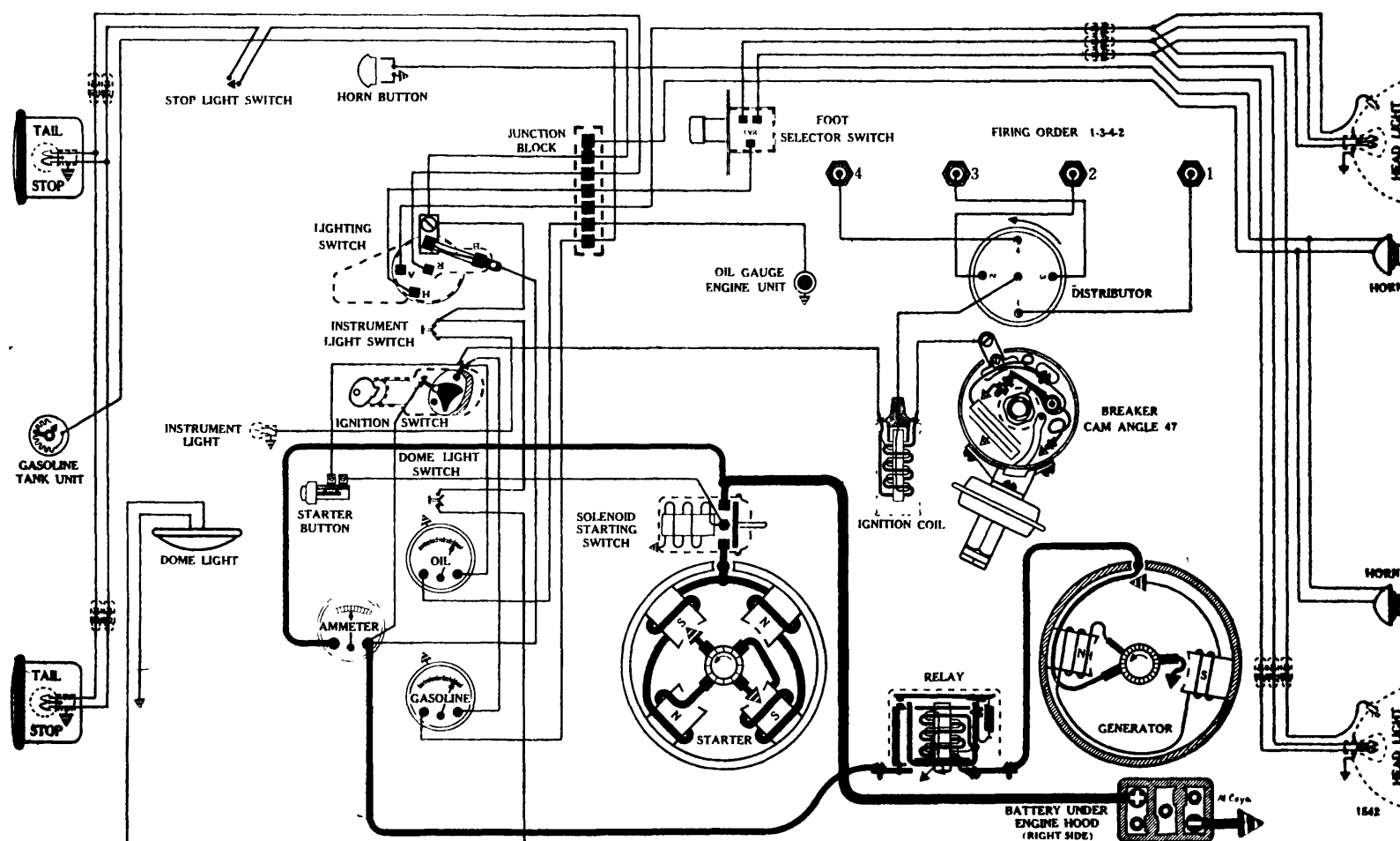
Foot Selector Switch—R.B.M. Mfg. Co., No. 1076.

Stop Light Switch—R.B.M. Mfg. Co., No. 965.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2331; PARK—55; FENDER—63; SIGNALS—51; INSTRUMENT—55; SERVICE—51; LICENSE PLATE—63; DOME—87; STOP AND TAIL—1158.

WILLYS

Model 37, 4 cyl., (1937)

Engin { Bor 3-1/8
Str k 4-3/8

BATTERY

U.S.L., A-13-A, 6 volts. Negative Terminal Grounded
Starting Capacity—96 amps. for 20 minutes.
Minutes of Discharge at 300 Amps., Zero Degrees F.—1.9
Lighting Capacity—3.9 amps. for 20 hours (78 amp. hour).
Case—Length, 9; width, 7; height, 8 3/8 inches.

STARTER

Rotation, L. H., Com. End
 Auto-Lite, MZ-4049

Conn ction to Engine—Bendix Drive, Type RC10HD.
Running Free—70 amps. at 5 1/2 volts, 4300 R.P.M.
Cranking Engine—115 amps. at 5.1 volts.
Engin Cranking Speed—120 R.P.M.
Stall Data (on car)—300 amps. at 2.9 volts.
Lock Torque (for test bench use)—7.8 pound-feet, 420 amps. at 3 volts.
Brush Spring Tension—44 to 56 oz. on each (new brushes).
Push Button Starting Switch—H. A. Douglas Mfg. Co., No. 5617.
Solenoid Starting Switch—Auto-Lite, SS-4001.
Armatur—Auto-Lite, MZ-2089.

IGNITION

A-L T st 466

Rotation, L. H., Top View
 Auto-Lit, IGS-4007

(Full Automatic Spark Advance in conjunction with Auto-Lite IGT-1028-AS Vacuum Chamber. This chamber controls position of Breaker Plat Assembly No. IGS-2044, which is stamped with the figure 10).

Breaker—Contact separation .020 inch.

Cam Angles—Points closed 47 degrees; open 43 degrees.

Contact Spring Tension—18 to 20 oz.

Timing—5 degrees past top dead center. Loosen screw holding flywheel inspection hole cover, located in left top side of flywheel housing, and swing cover to one side. Slowly turn engine until No. 1 piston comes up on compression stroke and starts down on the power stroke. Stop when the flywheel mark "IGN" (located 5 degrees after T.D.C.) is directly under pointed end of inspection plate screw. With rotor under No. 1 Dist. Cap Terminal, breaker points should just open.

Spark Plugs—18-MM (Champion type C-7); Gap .025 inch.

Firing Order—1-3-4-2.

Vacuum Chamber (Auto-Lite, IGT-1028-AS; Test No. 467)—10 degrees (Dist. advance). Starts with vacuum of from 2 1/2 to 4 1/2 inches of mercury. Requires a vacuum of 15 inches for full travel.

Vacuum Advance Table (Auto-Lite, IGT-1028-AS Vacuum Chamber).

3.5	Start
4.65	1
5.80	2
6.95	3
8.10	4
9.25	5
10.40	6
11.55	7
12.70	8
13.85	9
15.00	10 (Max.)

WILLYS

Mod 137, 4 cyl., (1937)

Automatic Advance—14 degrees (Distributor).

500.....	250.....	Start
600.....	300.....	2
700 (Intermediate)	350.....	4
1240.....	620.....	6
1780.....	890.....	8
2320.....	1160.....	10
2860.....	1430.....	12
3400 (Max.)	1700.....	14

Condenser—Auto-Lite, IG-2671-K.

Ignition Coil—Auto-Lite, IG-4090.

Lock Ignition Switch—Mitchell Specialty, Type 17.

GENERATOR

Rotation, L. H., Com. End

Auto-Lite, GAM-4504 (Belt Drive)

Performance Data—Gen. Cold.

0.....	700.....	6.4
2.....	785.....	6.6
6.....	960.....	6.9
10.....	1100.....	7.2
12.....	1320.....	7.4
16.....	2400 (Max.)	8.

Motoring Freely—4½ to 5 amps. at 6 volts.

Max. Stall Current—18 to 20 amps. at 6 volts.

Field Test—4.2 amps. at 6 volts across field coils in series.

Brush Spring Tension—22 oz. Max. on each (new brushes).

Armature—Auto-Lite, GAM-2055.

Third Brush Adjustment—Loosen cover band. Shift third brush by hand. Mounting plate held in any position by friction clamp washers.

RELAY

Auto-Lite, CB-4008 (Mounted on Sub Frame)

Points Close—6.5 to 7.25 volts.

Points Open—.5 to 3.0 amps. discharge.

Contact Gap—.015 inch minimum (points open).

Armature Air Gap—.034 to .038 inch (points open).

LIGHTING

Switch—H. A. Douglas Mfg. Co., No. 5400-C.

Location—Behind instrument board.

Fuse—Single 20 amp. fuse (type 3A-20) on switch back. Protects all lighting circuits.

Foot Selector Switch—H. A. Douglas Mfg. Co., No. 5530.

Lamps—Refer to "Lamp Data" in Technical Section.
HEAD—2320; PARK—55; INSTRUMENT—63;
DOME—63; STOP AND TAIL—1158.